DOES FLYING HURT VIRILITY?

FLYING

AUGUST 1950 • 25 CENTS In Canada 30c

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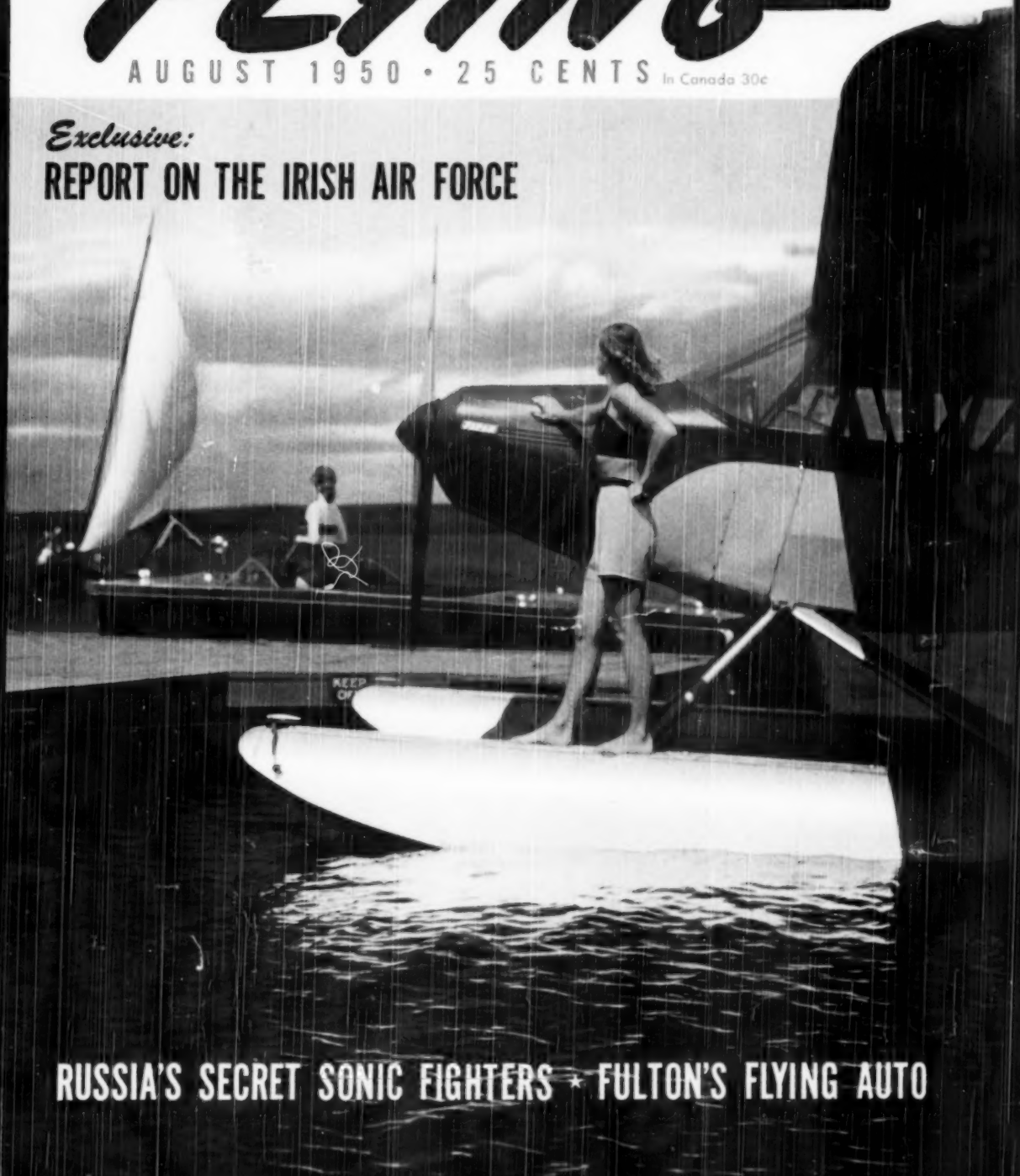

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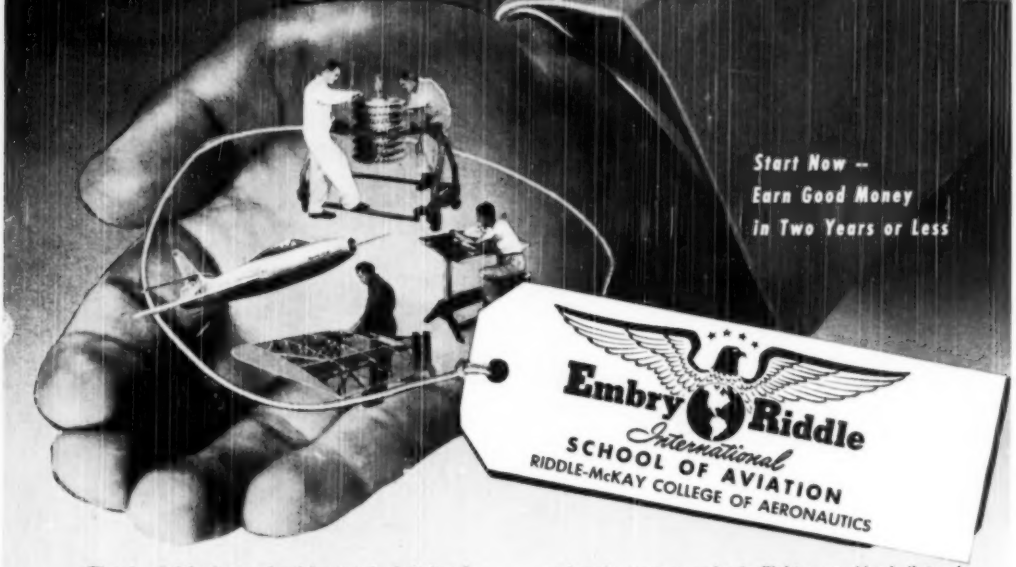

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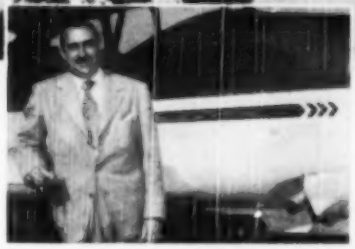

"MOST TERRIFIC AIRPLANE I'VE EVER FLOWN"

says* PAUL MANTZ, *famed inter-city speed and movie pilot, 3-time Bendix Trophy Race winner

"Ryan's way out front this year with the *Navion* Super 260!," continues Mr. Mantz, "I've never seen anything like it in my life. Ten minutes to 10,000 feet! That gives you an idea of its phenomenal performance. It's big and powerful . . . it cruises at 170 mph, yet lands at a sensationally slow 55 mph with *full load* and *no wind*. In every way it beats everything I've ever flown. It has both maximum performance and maximum safety. Anyone can fly it easily and safely. Its high altitude performance is amazing. Soundproofing, ventilation, the radio, interior appointments . . . everything is perfect. And that sweet-running 260 h.p. Lycoming engine! It drives the new Hi-Cruise propeller through silent reduction gearing at low RPMs for maximum efficiency and reduced noise level.

"The Super *Navion* is as outstanding in its class as the P-51 Mustang is among piston-engine fighters. And no wonder! They're both products of real engineering leadership. With its 1250 fpm rate of climb, fast cruise and 18,000 foot ceiling, the Super *Navion* has the same 'get up and go' I like so much in my P-51s. It gets off like a scared jackrabbit in just 400 feet . . . in 770 feet I was over a 50-foot obstacle with *full load* and *no wind*. And I found all this in a big, roomy, strong, full-sized he-man airplane that justifies the greatest ease of mind. Only in the Ryan Super *Navion* can you find this wonderful combination.

"Never before has there been a plane of such quality . . . such outstanding performance in *every* way . . . a plane so thoroughly reliable and serviceable. To combine all that in full measure is a master accomplishment."

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The ideal plane for those who want modern, safe air transportation at minimum cost. Features 205 h.p. Continental engine, has 55 cu. ft. cargo space, lifts 1029 lbs. payload with full tanks. Ideal for ranchers, contractors, etc.

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‹‹‹ *NAVION* SUPER 260

Lycoming-powered to cruise at an honest 170 mph. Outcruises, outclimbs, lands shorter than anything in its class. The 260 is the *Navion* at its very finest. Write today for complete free information.

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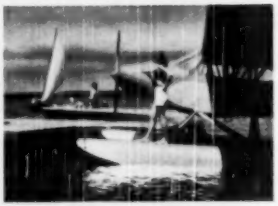

THE COVER: Piper Super Cruiser tied up on Lake Wallenpaupack in Pennsylvania. Mrs. William T. Piper, Jr. (in blue and yellow swim suit), stands on float.

EDITORIAL

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FLYING

AUGUST • 1950

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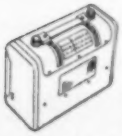
The LEARAVIAN is an entirely new kind of portable radio for airmen featuring the amazing "charging line" circuit that will more than quadruple the life of your batteries.



Use the highly versatile LEARAVIAN to fly the airway beams—to get the half-hourly CAA weather reports—to hear the control towers. Use it as a direction finder to guide you to your station. Use it to listen to your favorite standard broadcast program. Use it to entertain your "date" or to navigate your plane. Use it on AC current, DC, or its own self-contained batteries. And best news of all, use it on the batteries as much as you want, because with the unique LEARAVIAN circuit you can recharge them *yourself!* Simply turn the power selector switch to "charge" and plug the attachment cord into any ordinary wall outlet. That's all there is to it. With the LEARAVIAN you get more than four times the normal life out of your batteries.

The LEARAVIAN is a high quality, high sensitivity superheterodyne receiver designed for reception in three bands: the 200-400 KC airways band—the 550-1600 KC standard broadcast band—and the 2.0-5.5 MC marine band. Loop reception for accurate direction finding is available on all three bands. An external antenna connection and a jack for headphones further increase the LEARAVIAN's flexibility.

Turn on your LEARAVIAN and hear the excellent tone and signal clarity provided by its powerful speaker. Note the durable LEARAVIAN construction... the beautiful luggage-type case... the smartly styled design. Note its many convenience features such as the spring-loaded "lay-flat" carrying handle... the fingertip controls... the easy reading angle of the dial... the three-color band-selector switch color-coded to the tuning dial... the hinged "snap-open" rear panel giving easy access to the attachment cord, battery pack, and chassis.

The LEARAVIAN is truly the finest, most useful portable receiver ever built. Your choice of a rich maroon or tan case. Also available in a handsome mahogany-style case. Weighs only 14 pounds with batteries—8 pounds without. See it at your local airport or write us for the address of your nearest LEARAVIAN dealer.

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Here's Your New
'Noiseless' Radio Receiver
New Ear Type Receiver That's Really A Pleasure To Wear

New Aircraft Receiver
Low Cost Ear Type Aircraft Radio Receiving Unit to Replace Headsets

Fort Worth, Texas (Special)—The last word in lightweight ear type aircraft radio receivers, designed to replace the old fashioned headset now on the market. The new unit is the 'Bantam Eareceiver' manufactured and sold by the Dave Rumph Company, one of the largest aircraft electronic organizations in the country.

Costing only a third as much as similar type individual ear sets now on the market, the new 'Bantam Eareceiver' is designed specifically for the private and non-scheduled pilot. They are comparable in price to low cost 'ear-muff' type headsets.

In addition to their extremely light weight (less than one ounce) the new ear type receivers feature a unique adjustment which permits one molded type ear unit to adjust quickly and easily for any ear size.

The outstanding technical feature of the new 'Bantam Eareceiver' besides the amazingly low cost is the low volume level required by the unit for normal aircraft radio reception. Because the new individual 'Bantam Eareceiver' operates on an extremely low volume setting; annoying static and other radio noises are minimized even during periods of precipitation and in thunderstorm areas. When cabin speakers are rendered useless because of noise, the new 'Bantam Eareceiver' brings in both range and voice signals with an absolute minimum of disturbance.

Exhaustive tests conducted by the Dave Rumph Company on the fatigue features of the new 'Bantam Eareceiver' have shown that pilot fatigue on long trips is substantially reduced. As one pilot user of the new 'Bantam Eareceiver' puts it, "The new Eareceiver is as modern as tomorrow . . . The difference between these lightweight receivers and the heavy old ear pads is like the difference between static free FM radio and the old style crystal sets. When they are placed on the personal plane market they'll replace the old headphones in a hurry!"

- **Sturdy Construction Throughout**
- **Crystal Clear Reception**
- **10 Day Money Back Guarantee if not thoroughly satisfied.**

See the New Eareceiver at Your Dealers Today!

NOW Only $6.50
complete with 6 ft. cord and jack

BANTAM EARECEIVER — DAVE RUMPH COMPANY

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"Aviation's Leading Electronic Supply House"
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THE MAIL BOX

THE PULSE JET

I enjoyed reading "What Makes Engines Tick?" [April FLYING] because it presented complex, technical information in easy-to-understand language.

[However] where does the "pulsejet" fit into the picture? Is it a type of ramjet?

A. B. CALLAHAN
Columbus, O.

● The pulsejet is essentially a ramjet engine with a series of flutter valves in the front end. Instead of continuous combustion, there are a series of rapid explosions in the combustion chamber. Each explosion closes the flutter valve and gives the jet another boost forward. This forward movement opens the valve, another explosion takes place, and the cycle is repeated.—ED.

FROM ENGLAND

. . . Thought your readers might be interested in the enclosed photo of a Halifax A9 which has been converted by

Aviation Traders, Ltd., for the Egyptian Air Force.

I'd like to take this opportunity to give you a well-earned word of praise. I read quite a few aeronautical magazines . . . but FLYING tops them all. In addition to articles of general interest, much of the information is extremely useful to me as an amateur pilot . . .

T. A. CRAIG
London, England

REPORTER O'BRIEN

Reporter O'Brien's article "Let's Give Private Pilots Credit for a Little Sense" [May FLYING] was certainly refreshing. In most cases, newspaper accounts of aircraft accidents are a lot of rot. . . .

If orchids were given for newspaper articles such as this, O'Brien deserves one.

JOHN R. MYERS
Houston, Tex.

LONG-LOST FRIEND

The entertaining article "Young Man Goes East" [June FLYING] was of especial interest to me because I knew Dallas Cederberg, one of the men featured in the story. Dallas and I graduated from high school back in May, 1941, and I have not seen him or known of his whereabouts since that day, nine years ago . . .

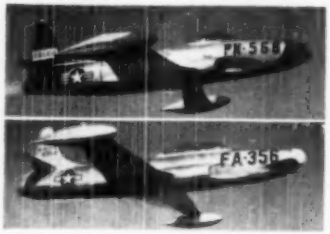
ANN QUINN
Napa, Calif.

WHAT'S THE DIFFERENCE?

Military News [May FLYING] says that Lockheed's *Shooting Star* is going out of production and will be replaced by the Lockheed F-94.

Can you tell me the difference between these planes?

BRUCE A. MOHRHARD
St. Louis, Mo.



● The F-94 is a two-seater interceptor outgrowth of the T-33 (two-seat training version of the F-80). The new all-weather jet carries a radar operator and about 3,000 pounds of radar equipment, plus the pilot. Engine is fitted with Solar afterburner for short bursts of extra power. Note radar in nose and lengthened rear fuselage of F-94 (bottom cut) as compared with F-80 (top).—ED.

MYSTERY BULLETS

. . . Bill Brennand failed to place the emphasis where it belonged. It's not so much that his companion was "Shot Down in Tennessee" [June FLYING]—but that he was shot down PERIOD!

Quite often out here at Lockheed, passenger and freight planes come in with bullet holes, and a lot of them are planes that never go anywhere near the South. This is a very serious problem—and it is not a sectional one . . .

SUE DEWBERRY
Glendale, Calif.

THE ENSIGN

Can you give me any performance figures on the All American *Ensign* built several years ago? What happened to this neat little two-placer?

RICHARD TRENCHER
New York, N. Y.

● The production version of the *Ensign* (five airplanes were completed; three were sold) had the following performance: top speed, 125 m.p.h.; cruise, 100

(*Continued on page* 63)

PLANE FAX

Quick picture of

CAPITOL SKY PARK

Sacramento, California

Over-all flight training—primary, commercial, instrument, multi-engined.

Charter and rental service—which members of the Legislature use to cover their areas.

Complete overhaul facilities, entire line of Standard Aviation products.

"How we flew 70,000 hours without trouble"

"Since we opened in 1946," writes Bob Watts, one of Capitol Sky Park's partners, "we've really put our planes through their paces, training nearly 1400 students and logging 70,000 hours. We give credit for trouble-free flying to the uniform high quality of Standard products.

"We've found it wise to major our engines at around 750 hours, but we once flew a Continental 85 hp for 1004 hours with only slight wear, thanks to RPM Aviation Oil. Through experience, we've proved that 'RPM' keeps engines cleaner and prevents rust and corrosion."

TIP OF THE MONTH

Check for full tanks —BEFORE take-off

"I know of several fellows who didn't quite make the field, simply because they didn't check their tanks before starting out. So before you leave on any cross-country—long or short—be sure you've got enough gas to get you there. It's a lot easier to check for full tanks on the ground than in the air."

BOB WATTS, partner, Capitol Sky Park

"It now costs us less to dust crops"

"Our dusters and sprayers with 450 P&W's were all switched last summer to the new 80/87 Chevron Aviation Gasoline from the old 91/98 fuel. This was a lucky switch, since performance stayed high while fuel costs dropped. Matter of fact, we've got 44 planes based here, all using new 80/87, getting full take-off power without take-off knocking."

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

Standard Oil Company of California

NOTES ON CIVIL FLYING

Promoting Cross-Country

National Cross Country Flying Association, P.O. Box 256, Boston 1, Mass., is a new pilots' organization devoted to promotion of cross-country flying in civil aircraft. Association will organize transcontinental and local group flights and award recognition certificates for cross-country experience. Two annual transcontinental group flights are among first activities planned.

Long Midget Being Built

Long Midget, formerly called *Midget Mustang*, never did get into production at Schweizer Aircraft because anticipated 10 firm orders, with $1,000 deposit

each, were not obtained. Two planes have been built in Lock Haven, one of which has been sold and the other kept as a demonstrator. A few *Long Midgets* will be built this year on special order. Price is still $4,995, FAF, Lock Haven.

Simpler Cross-Wind Gear

New Geisse cross-wind landing gear greatly simplifies castering problems, according to Inventor John H. Geisse. New gear, not yet on market, would sell for fraction cost of existing cross-wind gears.

VA Simplifies Forms

Veterans Administration has issued a set of affidavit forms for GI Bill flight training which are expected to simplify procedures for applying for training. They include forms on which veterans must submit complete justification that learning to fly will be in connection with present or future business or occupation.

Narco's New Flasher

New NARCO navigation light flasher for planes below 12,500 pounds weighs two ounces, sells for $9.95 with installation kit. It can be installed on all planes operating with 12- or 24-volt electrical systems.

Land of Milk and What?

British aviation journal, *The Aeroplane*, recently suggested that England should copy the U.S. airmarking program. They didn't mention the U.S. by name, however; they called us "that transatlantic land of milk and hooey."

Learn to Fly While You Travel

Businessmen can learn to fly while they travel under a new plan put into effect by over 500 Piper dealers. Here's how the plan works: Piper dealers charter a four-place *Pacer* to businessmen wanting to make several out-of-town stops. En route, fundamentals of flight (straight and level, climbs, glides, turns) are practiced. At the same time, the businessman learns practical navigation and map reading. At stops, landings and traffic procedure are taught. After several trips, training periods on landings are held either at home airports or at airports en route. Then the student is ready to solo with a background of practical flying experience.

Postpone Air Races

The National Air Races at Cleveland have been postponed to May 19 and 20, 1951, to coincide with Armed Forces Day. Continental Motors Corp. will sponsor the 190-cu. in. class event, formerly known as the Goodyear Trophy Race.

FCC Cracks Down

The Federal Communications Commission is checking on radio equipment of private planes to make sure that correct frequencies are being used, and also to see that craft are properly licensed. FCC points out that it is against the law to use radios for personal or business purposes. All buyers of new transmitters, or planes with transmitters must obtain licenses which must be renewed periodically.. Necessary forms and information can be obtained from Federal Communications Commission, Washington 25, D.C., or from any FCC field offices.

Paint that Truck Yellow

Vehicles used on airport landing areas must be painted chrome yellow, according to CAA Technical Order #N4. Other vehicles not usually operated on landing areas have to fly an orange-and-white checked flag when they're used on runways, taxiways or peripheral roads.

Lear Reprices Omnimatic

The Lear VHF Omnimatic system, which gives continuous magnetic bearings from the plane to the selected VOR

station, has a new price of $595, which includes Omniscope, VHF transmitter-receiver, power supply, junction box, whip antenna and omnitenna.

Tactile Talk

Ralph Holcombe, who developed the buzz bonnet system of flight training, has perfected a new method of training called "Tactile Talk" that eliminates all foreign language barriers. The instructor flies a dummy stick which transmits tactile signals to the hand of the student. The instructor at no time need touch the aircraft controls. Holcombe claims that any student can make safe take-offs, fly a fair pattern and make safe landings solely by responding to the signals he feels on his stick grip.

Compulsory Insurance?

A compulsory liability insurance bill covering civilian aircraft has been introduced in Congress by Representative McGuire of Connecticut. The measure designates the CAB as enforcement agency and would require all plane owners to take out insurance or post bonds to make themselves responsible for damages or injuries resulting from the operation of their planes. AOPA contends that by blanketing in the poor risks the bill would double the cost of present insurance policies.

Mrs. Ana Luisa Branger of Venezuelan Embassy, Washington, set new official lightplane altitude record of 24,504 feet in Cub Special.

Luscombe Adds Flaps

A wing flap kit suitable for installation in metal-wing *Silvaires* has been announced by Luscombe. New kit, which sells for $300, improves short-field performance. Flaps give *Silvaire* 35 m.p.h. power-on stall with full gross load, permit plane to take off over 50-foot obstacle in 600 feet or less, land in 450 feet or less. Production of first 50 new *Silvaires* is under way. The 90-h.p. *Silvaire Deluxe* is priced at $3,695, and a stripped *Economy Silvaire* for which customer will furnish his own engine is priced at $2,650. Both models will have flaps and a new swing engine mount. Final plans for producing the four-place *Silvaire Sedan* are deferred until 1951.

Look To

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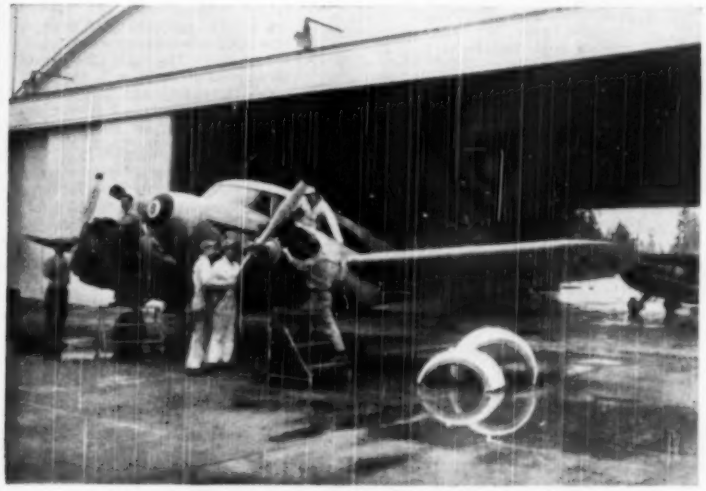
- There is housing available for both married and single students at nominal rental.
- A new class starts each month. Commence your training now and take advantage of the good positions available in this ever expanding industry.



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MILITARY NEWS

. . . **Soviet jets** are reported "pouring" into China to support the Communists. At least 250 Russian aircraft, many of them jets, are said to be based in China at present, with more on the way. Some of them apparently have radar and if so, are perhaps the first Soviet radar-equipped night fighters. Eleven sweptback Yak jets were sighted at Shanghai airfields; and at another Communist airport strength was said to be 29 jet fighters, five converted bombers and 15 Jap "Type 90" aircraft.

. . . **Secret** revolutionary waterborne jet fighter, known as the *Skate*, will be next Convair development in seaborne aircraft.

Multi-bladed prop, built by Aero Products for Douglas Skyshark, can deliver more propulsive horsepower than any other prop in use. Note size of man, left.

. . . **Three new jets** under test at Muroc, Calif., are Lockheed XF-90, McDonnell XF-88 and North American YF-93. All, reportedly, have flown over 800 m.p.h., and have dived at almost 850 m.p.h.

. . . **Guide** issued to U. S. airmen in Britain says in part: "Keep American and English pay scales out of your conversation. American airmen are the highest-paid servicemen in the world. Do not belittle those who are paid less." The guide also suggests that airmen not criticize the Royal Family, discuss British politics, or joke about who won the war—or paid for it.

. . . **Army** has asked Air Force to procure a "substantial number" of Cessna 305's (based on Cessna 170 but with bigger engines). The 305 has a Continental E-190 powerplant rated at 213 h.p. on take-off. Official designation will be L-19. Piper has protested, saying the Air Force failed to adhere to its own specifications. W. T. Piper said the Air Force had specified a 1,000-pound weight limit on the planes but that the Cessna 305 was about 50 per cent heavier than that.

. . . **In May** FLYING, England's C. G. Grey was quoted as saying, along with other derogatory remarks about American planes, that "in 1941-45 . . . not one U. S. aeroplane ever came over here fit to go into action without being modified . . . And when the early '*Flying Fortresses*' came over, four engines and 13 men were needed to carry a ton of bombs. . . ."

D. B. Martin, a Boeing liaison engineer with the 8th Air Force during the war, answers Grey: "Modification requirements changed so rapidly during the air war in Europe that it would have been chaotic to the bomber production line to have incorporated the combat requirements of the European-African-Pacific theaters of operation . . . The B-17C, tested by the British, called for a crew of six. They went into combat with seven aboard. The B-17G crew was 10 men. Incidentally, the B-17C maximum bomb load has been officially released as 10,952 pounds."

. . . **Arthur Godfrey** handled the controls of an F-80 at Bolling Field on Armed Forces Day. "I pushed the nose down," he says, "pushed the throttle forward—and as we came across the runway and went by the people, the airspeed read 520 m.p.h. Oh, brother!"

. . . **Zero Reader** will be installed in North American F-95A interceptors, and probably in Lockheed F-94's and Northrop F-89's. The Sperry instrument combines readings usually supplied by the gyro horizon, directional gyro, magnetic or Gyrosyn compass, sensitive altimeter and instrument landing cross-pointer meter.

. . . **Estimated cost** of a hydrogen superbomb: $2,880,000,000,000, according to Gordon Ferrie Hull, emeritus professor of physics at Dartmouth College.

. . . **Russia's** Siberian air bases are not believed adequate to support heavy-bomber operations.

. . . **American jet fighters**, probably F-84's, are slated to be stationed in East Anglia, England, on a permanent basis. As FLYING went to press, the squadron's transatlantic flight was considered imminent.

. . . **Unofficial name** for Republic's swept-back, fast-climbing XF-91 interceptor is "*Thunderceptor*."

. . . **Republic Aviation** survey has "unveiled" a new lingo among jet pilots. Thirty-one terms are included in a list recently issued by the aircraft company. "And there I was fat and flute happy at 30,000 feet," would be translated: "I was going along okay at 30,000 feet, doing everything in the book—as well as many things which are not."

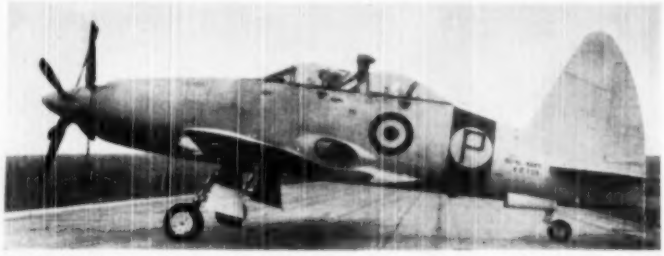
. . . **Fifty per cent** more organized Naval reservists will get carrier training this summer than did in 1949. At least 70—perhaps 80—squadrons are slated to go aboard the flat-tops for re-qualification.

. . . **At least** 23 bases in the Arctic and Far North could be used by USAF in event of war. They include one in Iceland, eight in Canada, eight in Alaska, three in Greenland, two in the Aleutians and one in Labrador.

. . . **Army wants** a 300 m.p.h. convertaplane, capable of hovering at 5,000 feet. Military officials would like a flying model procured from 1951 appropriations.

. . . **RAF** will equip "a number" of its Far East Air Force squadrons with jets in near future. It's rumored that Malayan RAF squadrons will get jets, and their piston-engined fighters will go to French units in Indo-China. First line operational craft now in Malaya number about 60.

. . . **Briefs:** The 28th Strategic Recon Wing recently got first Convair RB-36 reconnaissance plane . . . On January 1, there were 146 Negro pilots in USAF . . . The Bell X-1A will fly the first of the year, may reach 1,700 m.p.h. . . . The 92nd (M) Bomb Wing at Spokane AFB will be next Strategic Air Command unit to get B-36's . . . North American *Mustang* is still operational in Air Forces of France, Australia, Sweden and Chinese Nationalists . . . RCAF today has about 17,300 men and nine operational squadrons . . . Britain is developing a jet bomber with a 2,000-mile radius of action . . .



Westland Wyvern T Mk. 3 is a new British naval trainer. Note the periscopic gun sight.

ZERO reader*

for Executive Aircraft . . . Available **NOW** *for Immediate Installation*

• MANY EXECUTIVE aircraft owners . . . business men who must get to their appointment quickly . . . have been so interested in obtaining the Sperry Zero Reader* for their planes . . . that several of the first instruments to come off the production line have been allocated to them.

• Developed by Sperry with the cooperation and encouragement of All-Weather Flying Division, USAF, and the Air Transport Association, the Zero Reader is finding wide acceptance with leaders in industry who find it profitable to have their own aircraft. And the pilots of these planes are getting new assurance of on-schedule flying and landings with this instrument. They find that the actual job of piloting and making manual instrument approaches is greatly simplified.

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• Our nearest district office will be glad to give you full information.

Among the many companies that have purchased a Sperry Zero Reader for their executive aircraft are:

Bethlehem Steel Co.—Lockheed Lodestar
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Avco Manufacturing Corp.—Lockheed Ludestar
Texas Eastern Transmission Corp. Douglas DC 3
Briggs Manufacturing Co.—Grumman Mallard
Champion Spark Plug Co.—Beechcraft
Gaylord Container Corp.—North American B-25 and Beechcraft
C. F. Kettering, Inc.—Grumman Mallard
Union Producing Co.—Douglas DC 3 and Lockheed Lodestar
General Electric Co.—Douglas B 23
The Fuller Brush Co.—Grumman Mallard
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WORLD LEADER IN JETS.... LOCKHEED

T-33 JET TRAINER

The Lockheed Aircraft Corporation, largest producer of jet aircraft in the world, has built almost as many jet airplanes as all other U.S. manufacturers combined. In fact, Lockheed has built jets at the rate of more than one a day—*every day for more than five years.*

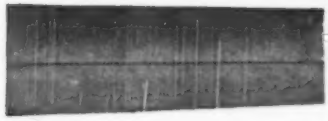
Important member of the Lockheed jet family is the two-place T-33 Jet Trainer (shown here), only jet trainer airplane built in America today (Navy designation: TO-2). This dual-control fighter-trainer now trains the pilots for the supersonic fighter planes of the Army, the Navy and the Marine Corps.

The experience obtained in the design, development and manufacture of jet fighter planes is invaluable in the Lockheed laboratories where the designs of the future are taking shape today.

LOCKHEED

Aircraft Corporation, Burbank, California

Look to Lockheed for Leadership



Bill Renshaw
State Fairgrounds
Indianapolis 5, Ind.

VIA AIR MAIL

Flying Farmers, U.S.A.

WHY NOT FLY?

This column's head over heels in a survey to find why more farmers don't fly. We'll have results of our findings ready for September FLYING.

Leonard E. Nelson, secretary of the Nebraska F-F's, says: "Airports two and three miles from town, and sometimes more, are a detriment to aviation. Where would the auto industry be if we had to park our cars three miles from town and then hire a horse and buggy?"

Nelson's suggested remedy: a strip at city limits with a street set aside as an airplane thoroughfare, enabling pilots to taxi to a tie-down lot close to the business district.

★ ★ ★

BIRD'S-EYE VIEWS

The lightplane's not yet just "another farm tool," as some zealot once termed it, but it's selling soil conservation more effectively than any other machine.

First large-scale Soil Conservation Airlift was staged by Fred O'Hair, a Greencastle, Ind., banker. He offered farmers in his area an airplane inspection tour of their farms.

More than 500 farmers took the bird's-eye tour. For most, it was their first plane ride. All were convinced that better soil conservation practices are long overdue.

Cost to Banker O'Hair was about $2 per passenger.

Since then, hundreds of Soil Conservation Airlifts have been staged across the nation, with thousands of farmers seeing the ravages of erosion as it can be seen only from a plane. Some lifts have been staged by Flying Farmers, some by civic-minded businessmen, and a few by airport operators.

Seed corn sales add to income of some farm airports. Vandalia operator George Gibbons (left) discusses seed with John Kime, Illinois Flying Farmers president.

At Vandalia, Ill., 300 farm folks took an air inspection tour of their farms recently. The airport stood the tariff.

"Some of these farmers taking their first plane ride will come back for flying lessons," said Airport Manager George Gibbons, "and some will buy airplanes." Gibbons also had a booth where farmers could sign spraying contracts or place their orders for a well-known hybrid seed corn, for which he is a dealer.

McLean County, Ill., Flying Farmers report they carried 106 non-flying farmers 4,500 air miles to show them erosion destruction and erosion control.

In Ohio, Ralph Young of the Ohio Aviation Board has lined up 35 county-wide Soil Conservation Airlifts, all to be staged before frost. They are charging farmers a nominal fee.

★ ★ ★

NAVY TOURS

More than 1,000 mid-western Flying Farmers recently voted to continue their program of visiting Naval air stations. Their appetites for first-hand information whetted by tours to Naval stations at Glenview, Ill., and Pensacola, Fla., the land-locked F-F's will next invade the Grosse Ile, Mich., Naval establishment. Scheduled to arrive on July 31, the F-F's will sleep in Navy bunks and eat Navy chow until they depart late the following afternoon. Forenoon of the second day will include a trip through the Ford assembly plant for the men and a visit to the Edison Institute for the ladies.

★ ★ ★

FLY TO THE FAIR

Remember when the main attraction at the County Fair was an intrepid pilot in goggles and puttees, flying a pusher biplane out of center field? Fairgoers never dreamed that in one short generation their descendants would be gliding their planes into those same fairgrounds, not as a stunt, but just because it would be an easy way to get to the fair.

Indiana started the ball rolling in 1945 by calling the last day of its state exposition "Flying Farmer Day." Since then, no less than a dozen state fairs have organized special days for Flying Farmers.

Typical example is Illinois, where Flying Farmers will grab the spotlight August 15. The state fair will furnish transportation to and from Capitol Airport and complimentary box lunches at noon. Farm machinery manufacturers will treat the Flying Farmers to grandstand seats, according to John Kime, Illinois F-F state president. He estimates that 1,000 farmers will fly to the fair.

County fairs are also making things attractive for air-minded farmers. The Kankakee County, Ill., fair board recently constructed a 2,600-foot east-west landing strip on its property. Planes will be tied down within 100 yards of the grandstand. August 9 will be Flying Farmer Day at the Kankakee fair.

★ ★ ★

MEET MR. BUNYAN

The mythical Paul Bunyan will relive in the minds of Flying Farmers as they head toward Bemidji, Minn., come the first week in September. The occasion: the Fifth National Flying Farmer Convention. Convention dates: September 4-7.

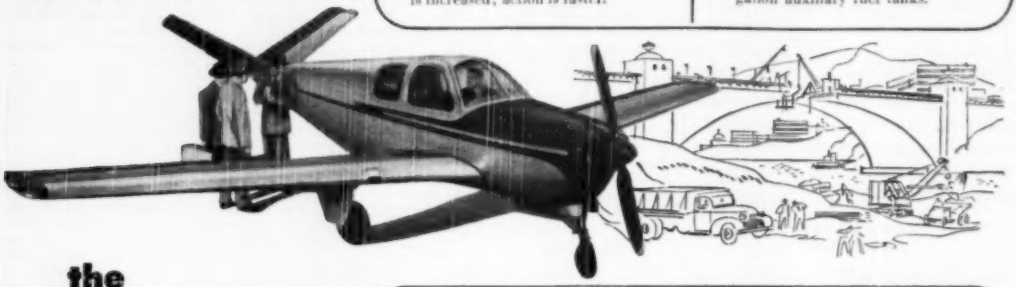
Hitch your business to this star performer . . .

Stellar take-off and landing performance

Short fields are no problem! New Beechcraft propeller develops greater static thrust. Flap travel is increased; action is faster.

Plan long flights — you have the range!

The Bonanza's 750-mile range can be increased to 940 or 1,145 miles by installation of 10-gallon or 20-gallon auxiliary fuel tanks.



the Beechcraft BONANZA

Beechcraft Bonanzas serve as company-owned planes in almost every field of American business. More than 2,400 are now delivered. They slice travel time by two-thirds; give key men the incalculable advantage of any-time mobility. *Features* put this trim, exceptionally fast plane at the "head of the class"; make it *the* outstanding buy. Here are just a few of the features that make this greater-than-ever Beechcraft a better-than-ever value.

Extra style and comfort features

Touches of luxury: four arm rests, four individual ash trays, special coat hanger rod to carry clothes with never a wrinkle.

Take-off horsepower rating increased

Now 196 h.p. at 2,450 rpm. Landing gear action speeded up: lowered in 7½ seconds, raised in 8½ seconds at 105 mph.

Room for all the luggage you need!

Baggage compartment is accessible from inside or out. Room, too, for four big people in the smartly tailored *quiet* cabin.

Sturdy framework gives you unsurpassable safety

All-metal framework is stronger than conventional construction. Exceptionally rugged: Shock, stress tests far surpass CAA requirements.

There's more to the Bonanza story! Let your nearest Beechcraft distributor or dealer "fill you in" on facts about the Model B35 Beechcraft Bonanza's exceptional economy in operation. Or for more information, write on your letterhead today to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles
Fuel economy, 9.5 gph

Beechcraft BONANZA

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

FLYING
VOLUME 47, NO. 2
AUGUST, 1950

RUSSIA'S Secret Sonic Fighters

Latest MIG-9 twin-jet fighter has new cockpit canopy, repositioned radio mast. Maximum speed at low altitude is believed about 515-520 m.p.h.

Have we underrated Soviet warplanes? Two European journalists say Red fighters rank with best in U.S.

By WILLIAM GREEN and ROY CROSS

HAVE WE underrated Soviet warplanes?

It becomes increasingly apparent that we have. Surprisingly to many, it is not only German advancements taken over by the Soviets that contributed to the new Red warplanes, but native Russian genius as well.

After several months compiling and checking original sources, we have here the most comprehensive and authentic review of Russian jet design progress that has yet been published.

We can say unhesitatingly that Soviet fighter planes are rugged and simple. They are easy to maintain and are easier to operate off rough advanced airfields than are comparable British and American types. They are extremely serviceable—and they are fast.

Three or four of the latest Red designs equal in performance the North American *Sabre*—most advanced fighter in service in the U.S.

At the end of World War II, the Soviets were rudely shocked to discover their planes weren't as good as they had assumed by comparing performance with that of obsolescent Nazi types they met on the eastern front. But the Kremlin's designers made a rapid about-face and exploited German research and development data to the fullest.

(*Continued on next page*)

Using Nazi scientists, Reds build advanced sonic craft

As a result, they reached advanced conclusions on supersonic flight about the same time as the U.S., and are keeping pace with the U.S. at present.

What little we know of Russian aeronautical research between the two World Wars is studded here and there with brilliant experimental work. In these instances it was bureaucratic suppression rather than lack of original Soviet thinking which dictated the conventional design of Soviet planes.

For example:

In 1936, B. N. Yuriev designed a prone-position, jet-powered, sweptback, all-wing airplane. It resembled the Northrop XF-79B but anticipated that craft by nearly a decade. The design was intended as more than a doodle; it was to have been powered by Russian jet units (possibly ram-jets) which were advanced in theoretical form by professors in the Zhukovski Air Engineering Academy. The design was emphatically rejected by the Soviet Office of Inventions.

Since the 1920's, the little-known designer B. I. Cheranovski has worked on advanced designs of lifting-fuselage and all-wing airplanes. Several designs using his principles were built before World War II. Between 1935 and 1937, Cheranovski and A. A. Kalininem created the BICh-14 twin-engined tailless bomber. Though it was powered only by two small M-11 radials of 125-h.p., it had a top speed of 156 m.p.h. The design was turned down (after flying far and well) by the Air Force and industry because of its radical layout.

After a long silence, due perhaps to being politically out of favor, Cheranovski recently produced a small glider research craft, the BICh-22. It appears to compare favorably with Canadian and British all-wing research gliders of recent years.

Instead of exploiting advanced thinking prior to World War II, the main Soviet effort was bent on producing orthodox aviation equipment. Plane types were strictly functional—they wanted a lot of planes and they wanted them fast. Sometimes they appeared to consider production and availability more important than the fullest fighting efficiency.

But in the main, Soviet military planes were reduced to a few simple types that were highly efficient for their particular roles. During the latter part of the war, these planes were opposed only by a few older-type *Luftwaffe* craft while the Nazis threw their best new combat planes against Allied onslaughts on the Western Front.

The Russians had no experience in dealing with modern rocket-equipped fighters like the *Mustang* and *Typhoon*, heavily-armed and fast medium bombers such as the *Marauder* and *Mitchell*, and gun-bristling day and night bombers such as the *Fortress* and *Lancaster*. Nor could they make headway with jet designs.

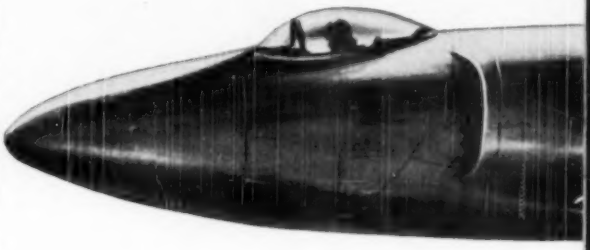
Thus, they approached the war's end with inferior equipment which they mistakenly assumed to be the best for their particular use.

The Reds were alarmed in the closing days of the war when they dug up advanced aircraft and engine data from captured German military, scientific and aeronautical establishments. Shocked into action, Soviet aeronautics began to loom from that time as a rival to U.S. and British air power—both in quality and quantity.

They started by experimenting with existing piston-engined fighters fitted with German pulse-jet motors beneath the wings and small rocket boosters in the tail. At the same time, they built the first Red jet fighters powered by Nazi-designed turbojets. (Illustrated with this article is the most accurate photo, somewhat retouched to include latest information available, of the La-9 piston-engined fighter with rocket unit in the modified tail assembly. It's doubtful if these machines entered squadron service but they no doubt furnished the Soviets with much valuable data on use of rocket units to boost performance of both piston-engined and jet-engined fighters.)

After World War II started, Russian research teams —headed by Abramovich and Stechkin—started working on jet and rocket propulsion. They were only moderately successful. Big trouble was the turbojet itself: as soon as a unit was captured from the Germans a hastily-designed test model was built around it and flown within a few months. This was a low-wing monoplane with two powerplants—a piston engine driving a propeller in the nose and a turbo jet in the rear fuselage with intake under the wing and exhaust duct under the tail.

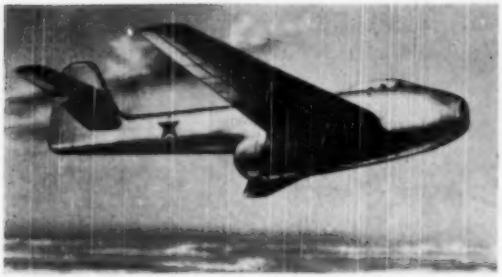
Early Soviet jet fighters, powered by turbojets based on Junkers and BMW designs, were the first hint to the West of the new ideas imported from Germany. First of these, and most successful until recently, was the MIG-9 (designed by a team headed by Maj. Gen. Artem Mikoyan, M. Gurevich and N. Matyuk). The MIG-9 is a simple, sturdy, hard-hitting machine in the best Soviet Air Force tradition. It's reportedly quite a handful to fly but is probably the best close-support craft in service today.



TRANSSONIC research plane, one of Reds' most advanced, is reconstructed from three authentic photos. Craft resembles British Supermarine 510, has 35° sweepback on wing leading edge. Note large side air intakes.

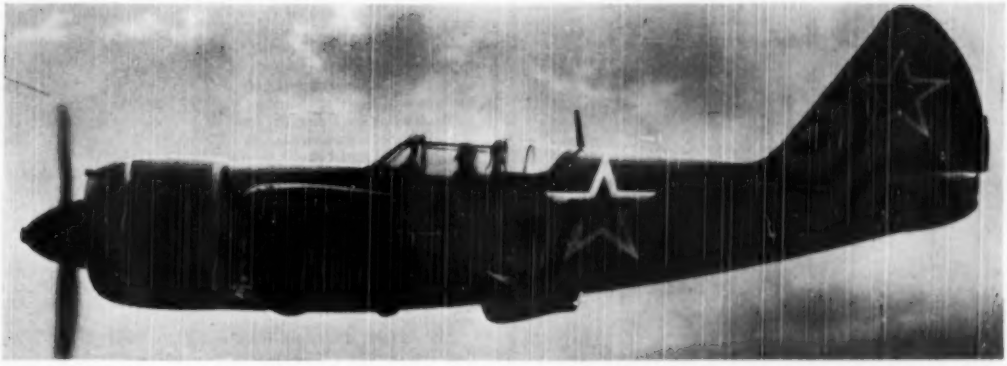
The MIG-9 is studded with one 30-mm. or 53-mm. gun and two 20-mm. ShVAK cannon. It's powered by two M-003 jet units, each with maximum thrust of over 2,000 pounds s.t. The jets are mounted side-by-side in the fuselage belly and exhaust together below the channeled rear fuselage. Top speed is apparently about 515-520 m.p.h. at low altitudes.

A smaller, lighter fighter, the YAK-15, has been designed by Colonel-General Yakovlev. It presumably is intended more for fighting and interception than for ground support, and is reported not so successful as the MIG-9. Wingspan is little more than 30 feet but the plane appears faster than the MIG-9, with a top speed of about 560-570 m.p.h. Internal equipment and armor are cut to a minimum, following Soviet wartime practice. Powerplant is a single axial-flow M-004 turbojet of 2,200-2,500 pounds thrust (a deriv- (*Continued on page 56*)



YAK-15 single-jet fighter represents little more than a passing phase in Red high-speed design. Redesigned version is illustrated.

YAK-17, "Russia's Thunderjet," is believed in service in Eastern and Asiatic areas. Drawing is reconstruction from photograph.



EXPERIMENTAL version of Lavochkin La-9 has liquid rocket unit in rear fuselage with exhaust efflux orifice below modified rudder. Another La-9 has been fitted with impulse duct motors under each wing. It is unlikely that any of these machines entered squadron service.

Does Flying Hurt Virility?

By HY SHERIDAN

Contributing Editor of FLYING

There's a rumor going around that...but maybe you've heard it.

BUZZING around Air Force ready rooms and hangars, like a wasp at a garden party, is a paralyzing rumor. If you do much flying you have probably heard it even though it is a new thing and hasn't had time to reach the wide audience that this article will give it. It is that the new flying—the flying at high altitudes and supersonic speeds—hurts virility and makes men sterile and even impotent.

At last year's National Air Races, one ruffled female was heard to complain that as far as she could see, the most conspicuous thing in evidence next to airplanes was virility. And a man who had been delegated to escort a famous high-speed pilot on a tour of Washington said that if the pilot had been any more virile they would have had to chain him.

Nevertheless, and despite such obvious statistical evidence as the fact that married jet pilots have more children than the average married American male, the rumor has persisted. It has had many things to sustain it, among which are certain obvious accompaniments to high-speed, high-altitude flying which conceivably could be detrimental to fertility.

There has been, for instance, the possibility that cosmic rays or increased radiation at high altitudes might make men sterile. There is the fact that continued shortage of oxygen (anoxia) may permanently impair the nervous system and that fertility is one of the first things affected. It has long been known that lowlanders living at very high altitudes tend to be sterile. And there has always been the possibility that the inaudible hypersonic sounds of supersonic flight may harm animal tissue.

The editors of FLYING have asked Hy Sheridan to investigate the problem. The following report represents the results of Captain Sheridan's investigations.

THIS IS A MOST serious matter. Already, it is reported many high-altitude flyers are getting away from being beasts and if this thing goes on the girls may yet be in the position of picking up the checks. Things have come to a pretty pass, the girls say, when there are no passes.

It is all too true that many's the girl lately who has inspected her charms, as the droll saying goes, in her boudoir vanity and found them all that shrewd Mother Nature intended, and who has wondered, in her innocent way, what the hell.

Your modest reporter is going to give you what is now known on this matter and you can come to your own conclusions. Never jump to a conclusion; slip up on it from down-wind.

Cosmic rays have been accused of causing sterility. They are the most powerful rays in creation and, under the Einstein Theory, a cosmic ray is about as powerful as such a thing can get; it approaches the limiting case. Cosmic rays get more and more powerful with altitude, and more plentiful too, and, as a coincidence, the place where they are the most powerful and most plentiful is at the same altitude level that our high-flying bombers such as the B-36 and B-47 cruise. This is what the fear and the original story were made of.

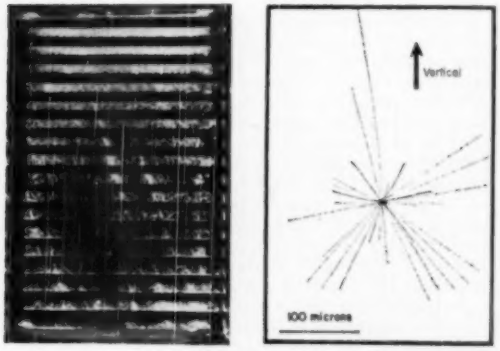
What is a cosmic ray? What does it do?

Nobody knows what a cosmic ray is for sure, so I can write freely. There is some evidence that a cosmic ray consists of a proton, but the evidence is rather indirect because it is in such a hurry that we can't get it to sit for its photograph. It comes to us very fast, though, almost with the speed of 186,000 miles a second, and why it is in such a hurry to get to a place like this is perhaps the greatest mystery of all.

When a high-tailing proton such as that hits the nucleus of an atom it hits with such gusto that the atom gets the stuffing knocked out of it. All sorts of particles go shooting off from the wreckage, and why not, for the nucleus has just been swung on by a wallop of around a million times a billion electron volts, to quote Dr. Marcel Schein, Professor of Physics at the University of Chicago, an expert who studies what is probably the least cooperative of all subjects.

Cosmic rays are going through us all the time but that needn't worry us any because a single cosmic ray can go right through with very little chance of hitting an atom because we are mostly empty space. Pilots with potbellies may run to a little higher average of hits.

"A cosmic ray can go right through me without touching a thing?" I asked (*Continued on page* 51)



Cosmic ray showers have terrific energy. Cloud chamber photo (left) shows large shower plus 16 secondary showers. Right, star is formed when primary cosmic ray particle hits photographic plate at 95,000 ft.

WHAT ARE COSMIC RAYS?

WHAT is a cosmic ray?

The word ray may confuse the layman because it tends to make him think of a beam of light, or a beam of X-rays. A cosmic ray is a fast moving particle which originates somewhere in outer space, seemingly everywhere in outer space for they come in from all directions. There is evidence that the ray is a proton.

Its velocity and its energy are, in the particle sense, fantastic. The incident proton may have an energy of "a million times a billion electron volts," to quote Dr. Marcel Schein, Professor of Physics, University of Chicago. A cyclotron that will give protons a velocity and energy of 30 million electron volts is a formidable machine indeed.

Dr. Schein says, "The majority of the cosmic ray particles at altitudes of 30,000 feet consist of electrons and gamma rays (X-rays) arising from so-called cascade showers. In addition, mesons, protons, neutrons, heavier nuclei, and other particles of unknown nature are present."

At the University of Chicago and at other places, seeds have been sent up to high altitudes to get as much cosmic radiation as possible, but they all germinated in a normal manner.

How the protons get their enormous velocities is not known, and none of the standard hypotheses stands up under examination. Your reporter would like to propose one of his own. It does, as the others do not, account for the high velocities and for the lack of any concert in direction of the particle flights, since the rays do not come more from one direction than from another although their distribution on the surface of the earth is influenced by our magnetic field.

CONTRATERRENE MATTER

Nuclear scientists have long speculated over the possibility of the existence in the cosmos of what was named "contraterrene matter." Our earthly atoms have positive particles in the nucleus, as everyone knows, with negative electrons, negatrons, circling the outside. On this earth we have identified short-lived particles that are positive electrons, called positrons, which have almost exactly the same mass as the electron, the negatron.

Why would it not be possible somewhere in our galaxy, and other ones as well, for a kind of atom to exist which is the reverse of the kind that we are getting too familiar with here on earth, where the negative material is on the inside, in the nucleus, and the electrons that circle the outside are positrons? Our mathematics permit the existence of such atoms, or so it has been said.

Of course, terrene atoms and contraterrene atoms cannot exist together because they would annihilate each other at once. When a positron and a negatron come together they turn into a photon, you know. If the two unlike atoms came close to each other they would fuse at once, and the release of energy would be very great, enough to account for the high velocities of cosmic rays. Since it is known that outer space is clouded with cosmic dust, if two unlike bits of dust came together the unlike atoms would destroy themselves as matter—at least a large part of the matter would be transformed, and turn into energy. Where do the protons come from then, the protons that compose our cosmic rays? If the two pieces of dust were not of exactly the same size or mass, there would be untransformed matter left over. Besides, calculations show that when a neutron from a contraterrene atom is shot out it would pick up an unmatched positron and become a proton, but this speculation is beyond our present treatment.

I should like to hear from those scientists who read this, who have any ideas on the matter.

—Hy Sheridan

Gas Turbines FOR LIGHTPLANES

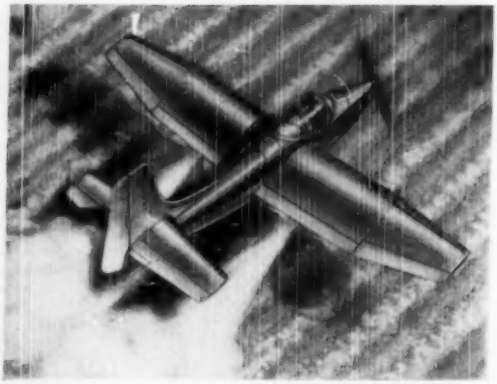
Boeing 502 gas turbine weighs only 221 pounds, could have take-off rating of 254 h.p. by 1952. It burns almost any type combustible fuel.

Lightplanes may be flying at 250 m.p.h. within 10 years. The secret? An amazingly simple and compact powerplant.

By S. D. HAGE and DONALD W. FINLAY

Chief Project Engineer, Gas Turbines
Boeing Airplane Company

Preliminary Design Group
Boeing Airplane Company



As duster, turbine-powered plane would have good payload, high take-off performance, low weight. Compressor would pump the dust.

THE GAS TURBINE may revolutionize lightplane design and operation within the next 10 years. It's possible that the next decade will see an almost complete change-over from the now-common piston engine to this amazingly simple and compact power unit.

In five years, lots of pilots will probably ask for kerosene or Diesel oil instead of high-octane gas when they drop in at airports. In fact, there's no reason why the next 24 months should not see experimental gas turbine-powered lightplanes in the air.

Future executive planes, powered by two gas turbines driving propellers, will be able to cruise at 220-260 m.p.h. at 20,000 feet or above with passenger comfort hitherto unknown. Turbines will also be used in smaller private planes, military liaison planes and agricultural designs.

But before the gas turbine becomes practical and competitive, we still have to do much development, testing and proving.

In present experimental quantities, as with any other new device, the engines are high-priced. Basically, however, the gas turbine is a simple machine. In production

quantities it should be much cheaper to produce than the reciprocating type. The little Boeing "502" turbine, for instance, has only 20 per cent of the parts of its piston-type sister developing the same power. Moving parts are few, and all motion is simple rotation. There are none of the sliding-parts, stop and start accelerations common to all piston engines. Combustion, instead of being intermittent and explosive, is a continuous, smooth process—the fuel burns all the time.

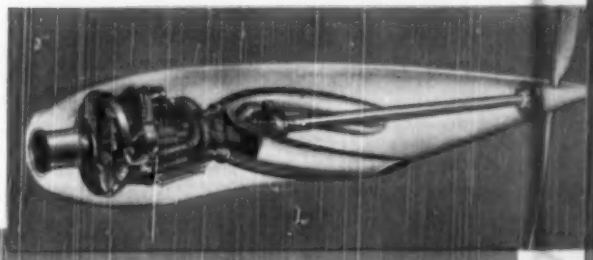
Fuel consumption is high—right now. It is being lowered, however, month by month by constant refining of component parts. Even with the present higher fuel consumption, the difference in cost of operating the turbine versus the reciprocating powerplant is not directly proportional to fuel consumed. The reason, of course, is because the turbine will burn almost any combustible fuel. Our tests at Boeing have been run largely on Diesel oil. But we have used kerosene, low and high octane gasoline and bottled gas. There is no reason why inexpensive heavy fuel oils cannot be used once proper atomizing means are developed.

The Boeing turbine is some 270 pounds lighter than a typical piston engine of similar power rating. Overall dimensions also are smaller. The typical six-cylinder, horizontally-opposed air cooled airplane engine figures out roughly at 33 inches wide, 31 inches high and 48 inches long. For the Boeing turbine, the same dimensions are reduced to 22 inches, 19¼ inches and 43¼ inches.

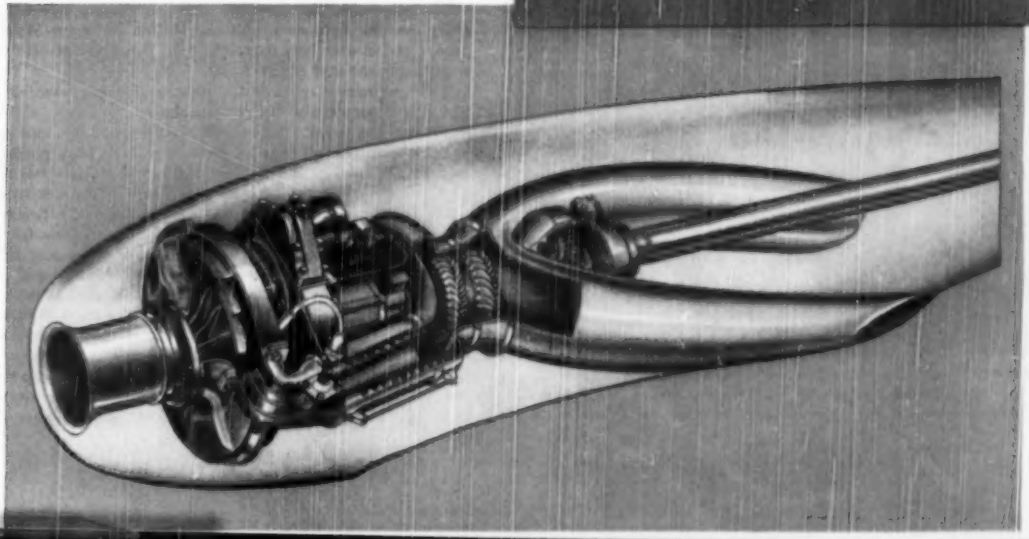
We estimate that the Boeing turbine, adapted to aircraft use, could by 1952 have a take-off rating of 254 h.p. Maximum continuous horsepower at 20,000 feet altitude would be 140. In place of a weight for the complete reciprocating engine system of 400 pounds, the Boeing turbine complete with propeller hub, starter, generator and lubricating oil weighs only 221 pounds! (*Continued on page 54*)

Proposed executive plane powered by two Boeing turbines would have phenomenal performance. It could easily be pressurized by air bleeds, and would fly 250 m.p.h. at 20,000 feet. Service ceiling would be over 30,000 feet.

☆



Turbine could be buried in wing of proposed plane to give exceptionally clean lines to pusher version. Only mechanical connection between power-producing section and propeller shaft is through an efficient gas torque converter.

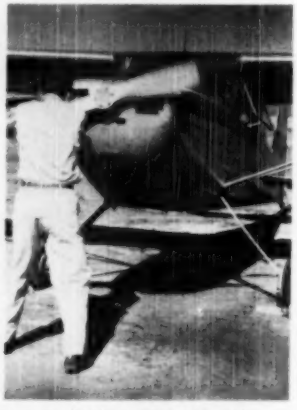


How Much 'Service' Can Operators Afford?

By JAMES JOSEPH

Stop-watch shows that 'extras' can easily put airport in red.

Operator uses stop-watch to time pilot's visit to airport. Total services took 25 minutes—yet pilot bought only five gallons of gasoline. The gross profit: 35 cents. With $1 per hour for lineman, airport barely broke even.



Transients expect, and deserve, assistance in planning route and servicing planes. But operators, working with small volume, discover that "extras" practically eliminate profits. Author suggests answer lies in self-service.

FOR FIVE YEARS, flying field operator Karl A. Gemende has been standing by—stop-watch in hand—clocking his airport revenues.

Gemende is like a man who takes renewed strength in an unfavorable diagnosis—it's comforting sometimes to know what's wrong.

"And I know why we're not making money," he says. "That's more than you can say for some operators."

The private pilot and the business generated by the private pilot aren't enough to keep an airport's finances in the black, Gemende has discovered. Most operators who rely solely on lightplane pilots for revenue will come up with operational deficits, he says.

At war's end, Gemende bought 77 acres five miles west of Riverside, Calif., leased another 40 acres, and with nine planes for rental and a peak of 160 GI-Bill students, established the Riverside Flight Academy.

Now, with the GI-Bill all but scotched, he has only 15 students in training for commercial, instrument and multi-engined instructors' ratings and is up to his goggles in trouble.

Let's walk down the flight line at Riverside Academy with Gemende and learn why he can't make money catering only to private pilots.

"I pay $700 a year in taxes on these 77 acres I bought on long-term purchase," explains Gemende, "and I've had to rent out 50 of the total 117 acres for farm land. Liability insurance costs me $350 a year. Counting rental on 40 acres, and taxes, I've got a $170 overhead every month --just to begin with."

We walked over to the hangar—with room for about 20 lightplanes. Three mechanics—including the foreman—were at work. Their average hourly wage was $1.61. The field charges $2.50—pocketing less than a dollar an hour on labor.

"Most garages around here charge $3.50 an hour for mechanic's labor," points out the operator, "and they don't have to be nearly as skilled as aviation mechs."

Out on the airstrip a Cessna was landing. Gemende took out his stop-watch. "Let me show you how the private pilot helps us to end up all but profitless," he said.

It's not that Gemende—or any other operator—doesn't welcome the private flyer. Quite the contrary. But I was about to see some startling proof of the part the private plane owner plays in operational deficiencies.

So we observed—as the stop-watch clocked off the minutes.

The Cessna rolled up near the line. A lineman was there to meet it—and to park the plane. Parking was a three-minute operation—by the stop-watch.

The pilot—like the average of seven visiting flyers who daily use the field as a halfway station between Mojave desert strips and Los Angeles—told the lineman to "put in five gallons and check her."

The lineman started with the windshield, washing it. The clock passed the six minute mark.

Then a gas truck was backed up to the plane, and five gallons metered off. Another four minutes. A portable compressed air cylinder took care of tire inflation and checking. The stop-watch rounded the 13-minute mark.

The visitor wanted directions, so he and the lineman retired to the big wall map in operations, close-by, to check the weather and worry over the next landing field. The visitor was in a talkative mood. He discussed the crop outlook. The weather. Where he might pick up a good used radio. And the nightlife in the city. It was a pleasant chat. But from the cold economic outlook of the stop-watch, a disastrous profit killer.

The chat and weather dope and miscellaneous information consumed another 10 minutes. As the visitor emerged from operations, the stop-watch (*Continued on page* 38)

A small, tough corps of fighting Irishmen stands guard at vital gateway to Continent.

Irish Sea*fires*, converted for land-based use and armed with two 20-mm. cannon, have a maximum speed of approximately 400 m.p.h.

The IRISH AIR FORCE

By CHARLES W. CAIN

IRELAND has been called the "nose of Europe." In the event of a third World War, it might well be the "gateway" to Europe.

As a base for aircraft, it has advantages over England and Scotland—there are few industrial centers and defense of those centers could be accomplished by small forces. Ireland also has an almost limitless number of suitable airfield locations.

From Irish air bases, long-range *Neptunes* or Avro *Shackletons* could sweep large areas of the North Atlantic area on anti-submarine patrol.

Whatever the future may hold for the world in general and Ireland in particular, the Western powers can take heart in the strong Irish opposition to the spread of Communism.

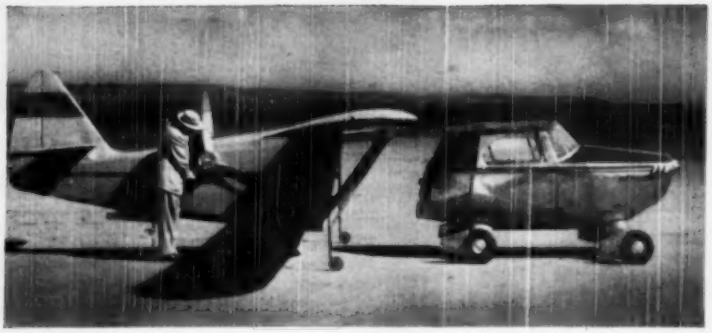
The Irish Air Corps, a small but trained organization, has long been shrouded in official secrecy. Recently I visited Dublin and nearby parts of Ireland, and with the cooperation of military authorities made a personal analysis of Irish military aviation.

While my opinions don't necessarily express the official viewpoint, they (*Continued on page* 64)

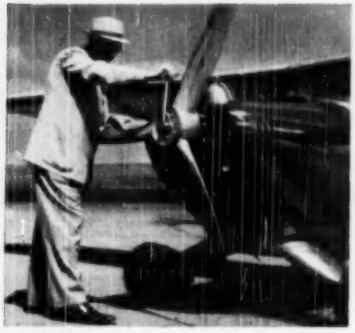
Headquarters of Irish Air Force is at Baldonnel (right) where corps school is located. Commanding officer is Col. Patrick Quinn (above), a veteran of the 1916-21 Irish War of Independence. Many officers study in English schools.

FULTON *Airphibian...*

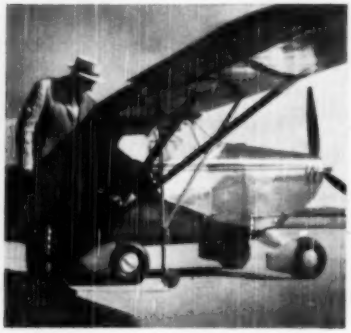
1 Flexibility of Airphibian is first shown when it calls for Author Robin at hotel.



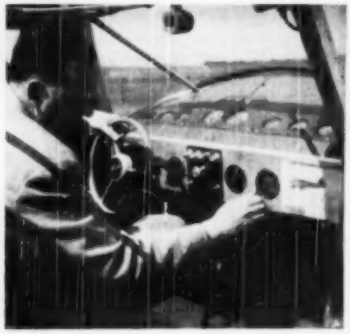
2 Author finds road and flight units are easily mated. Convertible top is put down and flight unit is lowered atop it. Then the two can be fastened together in five minutes.



3 Sensenich three-bladed prop is placed on hub and tightened with built-in wrench.



4 Pilot cranks wing wheels, retracts tail wheel, and the Airphibian is ready to fly.



5 The cockpit is simple. Instrument panel slopes upward and is leather-covered.

By BEN ROBIN

WHEN ROBERT E. FULTON, JR., phoned me to say the *Airphibian* was ready for check flight, I asked the usual question.

"What time shall I meet you at the airport?"

"Don't," he said. "Just give me your address. I'll drive over and pick you up."

And that's exactly how the *Airphibian* check flight started.

Bob drove to my hotel door in Atlantic City at about 4:30 in the afternoon.

"Well, Ben, how'd you like to travel up the Hudson River Valley this weekend?" he asked.

"That's fine—if we can drive out from the middle of this crowd around your—your—." I didn't know just what to call it.

Bob explained that people at the factory (Continental Inc., Danbury, Conn.) call the car section of the *Airphibian* the "road unit" and they call the wings and tail section the "flight unit." We climbed into the road unit and were off to pick up the bustle.

The *Airphibian* road unit drives much like a car equipped with Hydramatic drive. For forward speed, you move a shift lever (at the lower center edge of the seat) to the right and ahead. For reverse, you move it to the left and rear.

When driving, the right rudder pedal becomes the foot-brake, and a hand brake extends below the center of the instrument panel. The starter button is on the fire wall, just above the left rudder pedal. That pedal isn't used when driving on the ground. The foot accelerator is on the floor, right of the foot brake—and a horn button is on the dashboard.

Sounds much like your own auto's layout, doesn't it? Actually, it drives much like a "non-flyable car." The *Airphibian*, though, doesn't look like anything else I've ever seen. The road unit is four-wheeled with a con-

6 **In the air,** Flying's check pilot found the performance good. Airphibian cruised 110 m.p.h., was spin-resistant, landed about 55 m.p.h.

7 **At Ticonderoga, N. Y.,** author drove road unit eight miles to look at old fort.

FLYING's CHECK PILOT

EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Only aircraft holding a CAA Type Certificate are flown. The authors evaluate each aircraft through the eyes of the average private pilot who flies an airplane for business or recreation.

vertible top, and appears a trifle high for its width. Wheels extend wider than the body (or cabin). Two of us sat comfortably on the leather upholstered seat, and we had ample room on a shelf behind the seat for two medium-sized suitcases, hats and maps.

The dashboard has engine instruments, primary flight group, two-way radio and speedometer. Sun visors and a compass are mounted atop the windshield. Visibility is good over the low nose, and on either side through the two door windows. A large plastic window gives better than average convertible rear view vision.

It's just as easy to get in and out of the *Airphibian* as it is to enter and get out of most cars.

The car unit accelerated rapidly, and cruised along the highway at 40 to 50 m.p.h. The ride isn't "soft" but is about the quality of a ride in a light pickup truck or a jeep.

At the airport, I watched and timed while Bob readied the *Airphibian* for flight. First, he backed the road unit up close to the wing and tail section (which is all in one piece). Then he adjusted the wing and tail wheels to the proper height by means of individual cranks, and wheeled the flight unit over the cabin. With the convertible top down, he lowered the wing wheels until the flight unit rested on top of the road unit. Then it was just a matter of fastening the two together. (*Continued on page 58*)

Speedy tri-motored job is launched by author Pianck while model-builder Don Justice watches. Fly-powered "motors" are mounted so craft will give good two-engined performance (inset).

INSECTONAUTICS . . .

With engines buzzing, twin-motored craft roars through author's living room. Getting photo was a problem. David B. Eisendrath used stroboscopic equipment, took shot at 1/30,000 of a second. He couldn't catch plane, finally had to sit down and just wait for it to fly into range.

Anyone can be an expert insectonaut. It takes about five cents—and a fly.

By CHARLES E. PLANCK

ONE OF AVIATION'S strangest trophies once stood on the bookcase of Charles I. Stanton, former deputy administrator of Civil Aeronautics.

He won it with a flight of 28 feet. His plane was a tiny, weightless item made of soft balsa wood and microfilm, and his motor was—a housefly. The trophy is a tin bank shaped like a globe surmounted by a 10-cent model of a Waco N.

Mr. Stanton's fly undoubtedly would have made a longer flight except that my living and dining rooms are only 28 feet long, and the place was so full of housefly-powered airplanes that his entry had little opportunity to maneuver. The flight started at the mantel and ended at the window at the opposite end of the room. It was Washington's introduction to the science of Insectonautics.

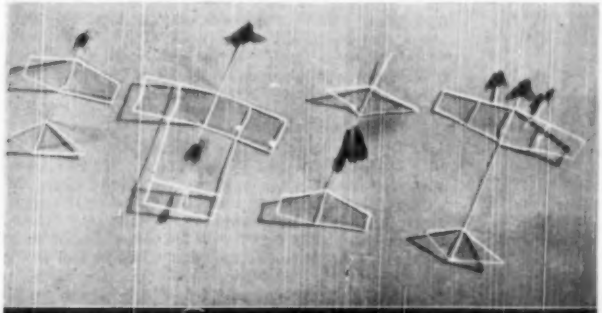
Anyone can become an expert insectonaut. It costs about five cents—the price of some balsa and a little microfilm. And it takes skill—the agility needed to capture a few healthy flies. But if you've got a nickel and the energy, you'll have a lot of fun building a fleet of fly-powered models some rainy summer afternoon when you can't be out at the airport.

The science began, I believe, back in 1940 when Joseph Elgin and William B. Schwab made tiny, microfilm-covered models and fastened light silken threads to the fuselage stick. They attached flies to the other end of the thread and hoped their gliders would be towed through the air. But the flights were erratic; the weight was too great for the flies and the gliders had no stability. The next step was to fasten the fly directly to the stick fuselage. This showed immediate results.

Schwab and Elgin could never solve the multi-flypower problem. In 1941, Charles and David Horsman of College Park, Md., built what was probably the first multi-engined insectoplane. With the collaboration of B. Russell Shaw, aeronautical engineer, they produced a twin-engined model which flew successfully. Instead of using wing engines, one of which was always cutting out and resting, the Horsman brothers mounted their flies along the stick fuselage, one behind the wing and the other out in front. They got fairly good single-engined performance and much more excitement out of each flight as their engines cut in and out at odd moments.

This tandem arrangement followed (*Continued on page 50*)

PHOTOS BY DAVID B. EISENDRATH, JR.



Four racers warm up prior to test flight. Giant tri-motored craft on right usually suffers from at least one dead engine, due to the innate laziness of flies.

HOW TO MAKE A FLY-PLANE

Cutting wing cross-pieces is exacting task. Use indoor-type balsa, sharp knife for slicing. Pieces are small as fingernail parings.

Use coathanger to lift microfilm from tepid water. Wet one side of wing and tail surface framework, then place on the microfilm sheet.

To remove ragged edges of microfilm, place a lighted cigarette about half an inch from the wing. Heat melts film up to balsa edge.

Bee (or fly) is taken from refrigerator and mounted on stick with quick-drying dope. Be sure legs are straight, not glued to stick.

Engine warm-up, prior to flight, is simple. Breathing on fly will wake him up; the warm air starts him kicking and attempting to fly.

WHAT PILOTS SAY ABOUT *Cockpit Hypnosis*

Readers support Hy Sheridan on cause of mystery crashes.

HY SHERIDAN didn't know what he was starting. When May FLYING hit the newsstands with Hy's article, "Hypnosis in the Cockpit," letters poured into the editorial offices. The Air Force told Hy it was investigating the effects of hypnosis on pilots. A large western university planned to study the problem. Arthur Godfrey urged millions of Americans to read the article. And over 150 pilots wrote Hy, describing personal instances of hypnosis in aircraft cockpits. More letters arrive in FLYING's offices in each mail.

What caused the furor? Hy pointed out that airplane cockpits are hypnosis clinics in miniature. Hypnotic conditions, he said, exist in the cockpit of any airplane flying at night or under instrument conditions.

Says Hy: "Maybe that story will save a life or two. I hope so. The letters I have been getting make the joint seem like a revival meeting—with everyone wanting to confess at once."

Sheridan article in May FLYING focused national attention on cockpit hypnosis as major factor in mystery crashes.

E. C. Donnan
Belleville, Ont., Canada

G. C. Conger
Van Nuys, Calif.

Cecil Lightheart
Vancouver, B. C.

H. J. Gronewold
Trivoli, Ill.

Carl R. Sproat
St. Paul, Minn.

Hunter L. Boice
Columbus, Ohio

Waking with a Start

. . . While flying as a staff pilot at Air Armament School, I was detailed to night bombing after a particularly busy day. On the last trip of the night (about 4 a.m.) I took extra precaution on the take-off for my vision was somewhat blurry. At 6,000 feet, we made several runs over the target area; the air was smooth and the student monotonous in his directions. I can't remember—nor could I remember at the time—the last two bombing runs. I do remember waking with a start upon hearing: "Exercise completed, sir." I turned off the cabin heat, opened the window, and with a few deep breaths regained my wits and returned to base. . . .

—E. C. DONNAN

Hypnosis Is the Word

. . . Along about October, 1945, of the recent ruckus, I was loping along through the overcast at night, on instruments, in a C-54 enroute from India to China. I left the cockpit for a few moments, and when I finally puffed my way back to the front office I saw that, according to the dials and gauges, we were in a 30° descending turn. The co-pilot was right there, slouched comfortably down in the seat, both hands on the wheel and glaring at the instrument panel with both eyes wide open. I latched onto the appropriate wheels and levers, and at the same time roared, "Where the hell ya think you're goin'?" He came to with a jolt and said, "I must've been asleep!" (Both hands on the wheel, both eyes open!) Hypnosis is the word.

—G. C. CONGER

Just Loafing Along

. . . Fifteen years ago, I was flying a small two-place open plane—and after approximately four hours in the air just loafing along on a nice, bright day, I came in to land at a field I had used many times . . . I came in, in a long straight glide into the wind. I remember being very warm and sleepy, and about 20 feet from the ground. The next thing, I woke up in the hospital. The boys on the ground said I flew right in and made no attempt to level out. I must have been hypnotized . . .

—CECIL LIGHTHEART

Robert Mack Light
San Bernardino, Calif.

Ralph J. Jones, Jr.
Cleveland, Ohio

Theodore M. Long
Somerville, N. J.

John D. Martin
North Hollywood, Calif.

Tom Matthews
Monterey, Calif.

James A. Doherty
Jamaica, L. I., N. Y.

James F. Crooks
Leominster, Mass.

Fred A. Carpenter
Berkeley, Calif.

Bob Wasson
Troy, N. Y.

Eleuthera Miller
Durham, N. C.

Relief from Tension

. . . Shortly after dark on October 27, 1949, I started back to San Bernardino (from Capistrano, Calif.) in my Cessna 140. The relief from tension in the smooth early evening air was in every way thoroughly delightful. To add to the feeling of relaxation, I lit a cigarette and inhaled a few delicious puffs. Everything continued to perfection itself as I made my way into the traffic pattern. With close concentration on the instruments glowing with their red light and with an occasional sidelong glance at well identified ground lights, I made a perfect pattern—getting set up straight and true on the runway lights at 300 feet above field elevation at the optimum point for that altitude. . . . The next thing within my field of consciousness was the crash when I hit nose first about 200 feet short of the runway. . . .

—Robert Mack Light

"I Couldn't Remember . . ."

. . . During the late, great scrap I was a carrier-based Navy fighter pilot flying *Corsairs*. . . . Even in broad daylight, I have experienced many times exactly the condition you describe. Many a time I have "come to" with a start and realized that, due to fatigue, cramped position, and the sheer, dull monotony of flying four-hour patrols straight and level, I had momentarily lapsed into a subconscious state. . . .

To this day I can remember "waking up" in the ready room and realizing that I couldn't remember anything about my approach and landing except the shock of the gear and taxiing forward. Constant repetition had enabled me to make the necessary operations in the approach with about 50 per cent mental consciousness. . . .

—Ralph J. Jones, Jr.

Fatal Fascination?

While I was an engineering officer on TBM aircraft during the recent war, several aircraft were lost in an unexplained manner during night operations. Through discussion with pilots, the medical officers discovered that the indicator for the oxygen breathing system held a fatal fascination under the conditions you mention.

The oxygen indicator in TBM's was, at that time, placed near the pilot's left knee where it was continuously visible. Apparently this indicator, flicking back and forth at respiratory speed of 17-20 cpm, was autohypnotic. Pilots agreed that at times it was almost impossible to tear their attention from it. As later attributed to this cause, one TBM, losing formation for a moment, was seen trying to form up on a buoy light with fatal results. When these accidents began to show a definite pattern, the indicator was moved to the rear and left of the pilot's armor where it was necessary to crane the neck to use it. No further difficulty was experienced. . . .

—Theodore M. Long

Couldn't Add Log

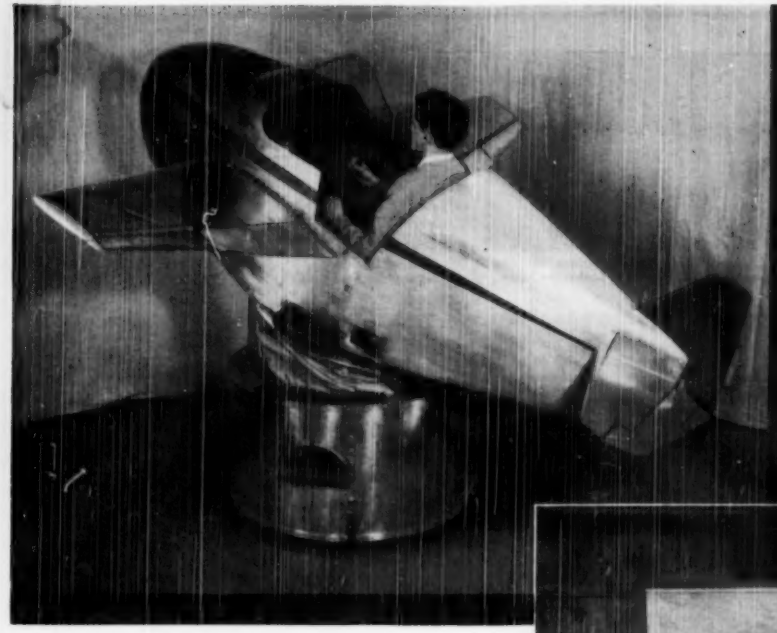
. . . I am an ex-Army pilot with over 1,000 hours, mostly in B-24's. Many times I have experienced similar sensations under the same conditions—smooth air on a long, night cross-country. Another thing that almost always happened to me was, as you mentioned, difficulty in adding up my log—or forgetting something in the cockpit and remembering it when I reached the ready room. Incidentally, I never remember during my whole course of training having these sensations, or methods of avoiding them, explained to me. . . .

—John D. Martin

Mental Lapse

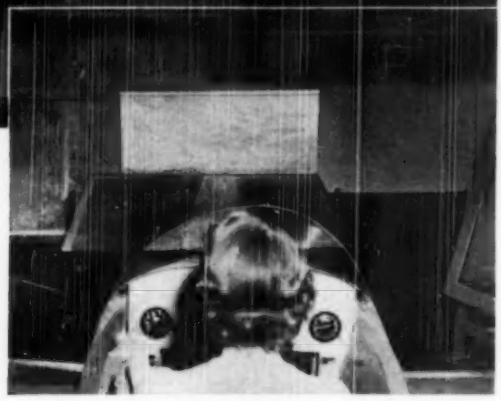
. . . I learned to fly in 1925, and now have about 2,500 logged hours and about the same number unlogged. . . . Last year I was flying from San Francisco to Burbank in a rented *Swift* 125 with a visual flashing marker beacon light on the left center instrument panel. The valley smog level was about 6,000 feet, so I cruised along a few thousand feet above it and hit Newhal about dark. I got a report on Burbank, tuned in the beam, and was waiting to hit the marker beacon before making the letdown through the smog. Suddenly the marker beacon light started to flash in the cockpit. I also was picking it up in the phones. What the devil was the light flashing for? Was it the gear? Was I running out of gas? I advised Burbank and pulled up and started around—and as soon as I got off

(*Continued on page 46*)



School Link enables Illinois University to solo students with average of only three hours' air time. Left, Link climbs in a realistic manner. If the climb is too steep the trainer stalls, "spins in."

Blackboard helps in teaching landings. Student is on final approach, with altitude, airspeed and glide angle coordinated. The instructor will move blackboard to simulate horizon during the landing.



Short-Cut To Solo

Dr. LESLIE A. BRYAN

Director, Institute of Aviation
University of Illinois

New Link trainer allows solo in only three hours' flight time.

FLIGHT STUDENTS at the University of Illinois have been soloing with less than three hours of flying time. A student recently was turned loose after he'd spent only 1 hr. 45 min. in the air.

We've even had the nerve to send some boys up for the private pilot test after less than 10 hours of flight instruction. And one student passed his test for a private license after 7 hr. 25 min. of flight time! We ran him in on a flight exam given by a CAA aviation safety agent under the guise of cross-checking to see if our own flight examiners were doing a satisfactory job. The agent gave him a grade of 78 and started to type out the private ticket before we confessed. He almost fainted when told the student had a grand total of 30 minutes' solo time!

These experiments were part of a general research program in pilot training, under way at the University of Illinois for nearly three years.

We have discovered we can teach the average student pilot enough to pass his private pilot flight test in about 10 hours of flight training plus 10 hours of School Link training. The School Link, built by Link Aviation, Inc., of Binghamton, N.Y., is a synthetic training device that plays a large part in our accelerated training program. Using it, our students should either receive their ratings at the end of 20 hours or should be allowed to use the remaining 15 hours required by law to gain information and experience regarding the utility and economy of the personal plane as a means of transportation.

We're now reorganizing our Private Pilot Flight Course —and we'll seek CAA approval for a course consisting of about 10 hours of fundamentals on the ground in the School Link, 10 hours of concentrated flight training in conventional air work, and 15 hours of cross-country and night flying, radio work, actual flight plan filing, and the use of airways and aids to navigation. We also plan to give one trip under the hood—to show the students that new pilots can't fly by instruments alone.

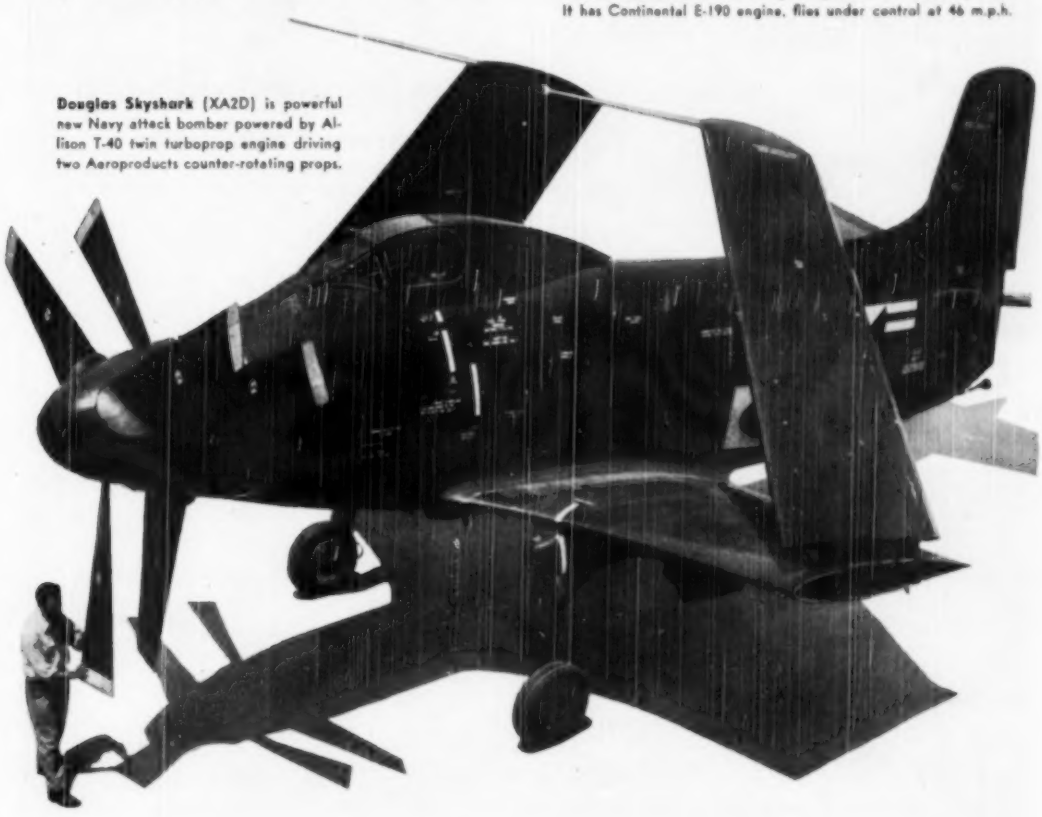
The School Link is a modified model of a preflight trainer. It's made of aluminum, and resembles an all-metal, open-cockpit, mid-wing (*Continued on page* 61)

HAVE YOU SEEN?

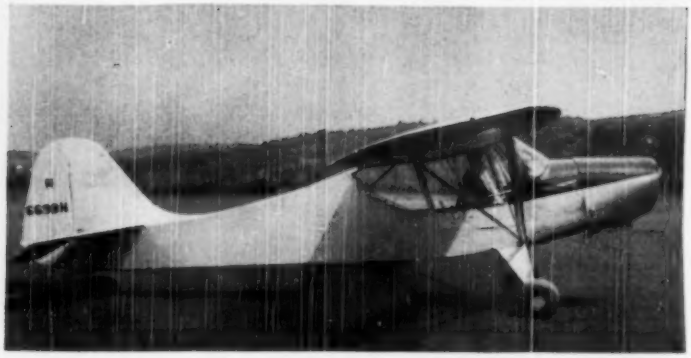
Rescue that failed was flown by Joe Cannon and Owen Niehaus in Bell helicopter. Mrs. Jeannette Bugay, 25, spent night clinging to rock in Niagara River, just above falls. Seconds after photo was taken, water capsized the 'copter. All were later rescued.

Cessna Model 305 won Army competition for liaison planes. It has Continental E-190 engine, flies under control at 46 m.p.h.

Douglas Skyshark (XA2D) is powerful new Navy attack bomber powered by Allison T-40 twin turboprop engine driving two Aeroproducts counter-rotating props.

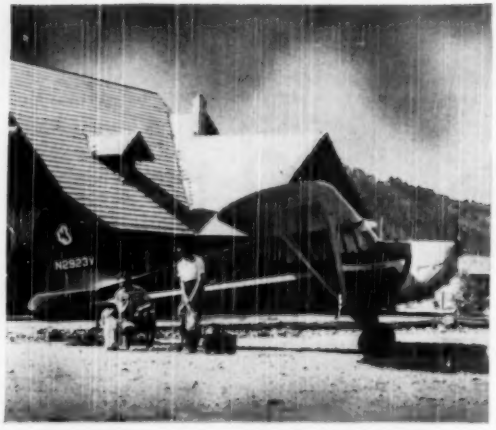


Sgt. Maj. Leo Valentin is the latest French "bat man." He plummets from high altitude, opening chute close to ground. Valentin models his stunt after Clem Sohn, who was killed while giving a performance 13 years ago.

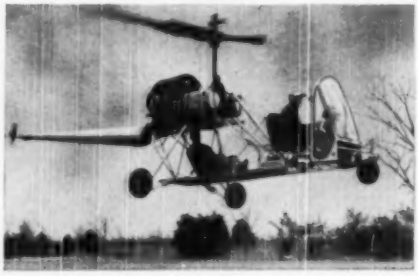


New Model 18 tandem Taylorcraft has Lycoming 125-h.p. engine, five hours range, 110 cruising speed, stalls at 38 m.p.h. Craft was developed for liaison work, has slats, flaps.

HAVE YOU SEEN? Continued



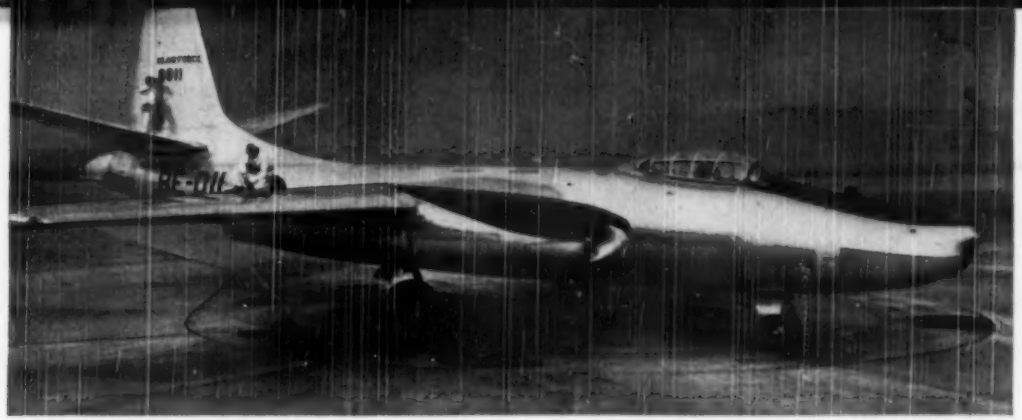
Call Air Cadet, formerly Interstate Cadet, is now being manufactured at Afton, Wyo. It is powered by 90-h.p. Continental.



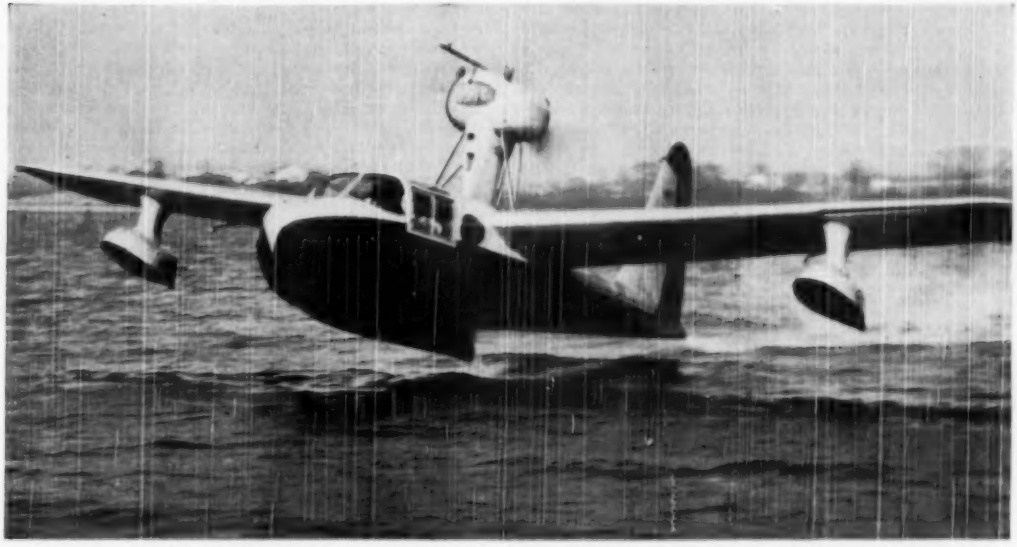
CERTIFICATE SEIBEL 'COPTER

SEIBEL SKYHAWK, the new helicopter from Wichita, is expected to go into limited production this fall and sell for $11,500. The *Skyhawk* has been certificated with a Lycoming 108-h.p. engine, and is currently being recertificated with a Lycoming 125-h.p. engine. Charles M. Seibel, president of the company, says the *Skyhawk* has been designed for small quantity production at reduced prices. Total cost of development and certification was only $80,000. Design is simplified. Aircraft engine is standard and conventionally mounted; gears are standard items being produced for other purposes.

Air Rescue Service is receiving Grumman Albatrosses—scaled-up versions of the Mallard. Albatross has two 1425-h.p. Wright engines, cruises at 225 m.p.h., carries crew of three plus 14 passengers or 16 stretcher cases. Fifty-eight have been ordered.

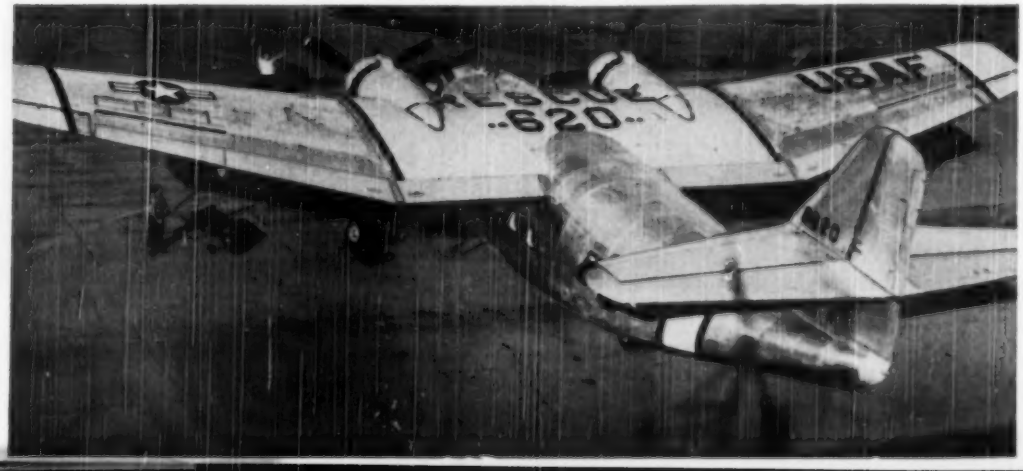


North American RD-45C is photo version of Tornado bomber. It has five camera stations, can operate at high or low altitudes, day or night. Power is four GE J-47A jets with 5,200-lb. static thrust each. Tactical radius is "over 1,200 miles," with wing tanks.



New planing-tail type hull has been tested for more than two years on Goodyear GA-2, three-place amphibian. Hull with deep pointed step and long afterbody gives shorter take-off run, and reduces tendency to porpoise, skip or yaw, in take-offs and landings.

Northrop Raider (C-125) is being delivered to Air Rescue Service for Arctic tests. Rescue versions will have wheel-ski landing gear. Production versions have bigger windows, additional dihedral on outboard wing sections, redesigned stabilizer assembly.



I Learned About Flying From That! NO. 129

By PETER M. BOWERS

A safe landing doesn't complete a flight—when you're in a floatplane and the tanks are empty.

BILL WALKER and I brought our Luscombe 8E down to a beautiful dead stick landing on the Mississippi river alongside St. Paul's Logan Field, which was about the quarter-point on our seaplane circuit of the U.S. [April FLYING]. We floated to a stop a short distance from the seaplane dock, but those few hundred yards turned out to be the longest ones between the points of a touchdown and tiedown that we ever encountered. We were at the mercy of a 20-mile wind, blowing toward us from the field; and right there we began to learn the hard way that a safe landing does not complete a flight—it is over only when the plane is securely tied down on the line, or in this case to the float.

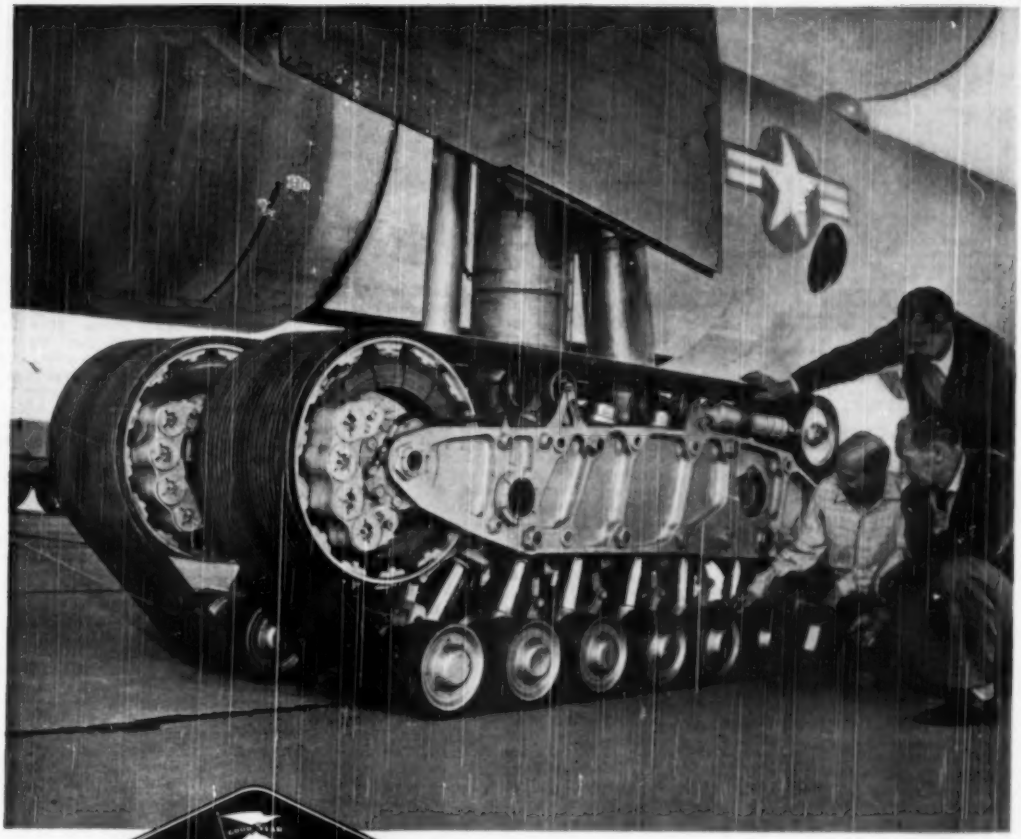
The accumulation of errors that resulted in our running out of gas began before our take-off from Bismarck, N. D. —but the background goes beyond that. Because the wing tank fuel gauges weren't accurate below the quarter-full mark, we used a time check on our fuel consumption. We'd put the same number of gallons in each tank before take-off, and would fly until one ran dry. A glance at the watch would tell us how long it had taken to run that tank through, and how much time remained on the other. The system worked fine. At each stop we'd equalize the fuel load and take off again on the same tank we had used coming in.

As originally laid out, none of the hops on the trip had been over 300 miles, computed on the basis of seaplane cruising speed, but using the 85 h.p. Continental's normal landplane fuel consumption. The conversion to floats, made just prior to the trip, resulted in the use of a 44-inch pitch propeller in place of a 51-inch, and when it was cruised at the same 2,350 r.p.m., we discovered a surprisingly low fuel consumption of 4.5 gallons per hour. This unexpected bonus, plus the fact that we were behind schedule, made us decide to combine some of the shorter hops. Weight considerations cut our fuel capacity from 30 gallons to 22, but even then, thanks to our reduced fuel consumption, we had a still-air range of 450 miles.

We originally intended to cover the 425 miles between Bismarck and St. Paul in two stages, but we decided to combine them, making the longest hop of the trip. Even with favoring winds, that was cutting it pretty close. But we would have water beneath us all the time on the latter part of the hop, and we could land easily if we had to. Just to be safe, we slipped in an extra two gallons.

The check-off, made while taxiing downward to take-off point at Bismarck, was the routine CIGAR (Controls—okay; instruments—okay; gas—right tank; airplane trim—okay; run-up—okay) so we opened the throttle. Just as we were starting our take- (*Continued on page* 44)

Battling wind, author tries to keep Luscombe away from coal barge while companion goes for gas. "If you've never held a floatplane against a 20-mile wind," says Bowers, "you've got a new experience in store." It happened because he tried to stretch plane's gas supply.



GOODYEAR
AVIATION
PRODUCTS

It makes the B-36 light on its feet

OPERATING a giant B-36 from landing strips not firm enough for its wheel loads is no longer a problem. Today one of these long-range bombers is making successful take-offs and landings on a new caterpillar-type track landing gear, designed jointly by Goodyear and Convair engineers. Out of its experience in building track gear for other planes, Goodyear developed endless rubber tracks, brakes and brake bogies required for safe handling of the world's largest bomber. This track gear gives the B-36 a "footprint" three times larger than conventional wheel gear—makes it light enough on its feet to use many additional runways. Goodyear leadership in landing gear design explains why more aircraft use Goodyear equipment than any other kind.

Goodyear, Aviation Products Division
Akron 16, Ohio, or Los Angeles 54, California

MORE AIRCRAFT LAND ON GOODYEAR TIRES, TUBES, WHEELS AND BRAKES THAN ON ANY OTHER KIND

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters are: 15th and New York Aves., Washington 5, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING MAGAZINE.

LIGHTPLANE BAN RAISED

Acting on the precedent established by the removal of lightplane restrictions at the San Francisco Airport, AOPA recently requested and got removal of similar restrictions at the Seattle-Tacoma International Airport.

Former airport rules required all aircraft entering the traffic pattern to maintain a speed of at least 120 m.p.h.

As AOPA pointed out to airport officials in Seattle, the ruling in effect closed the airport to personal aircraft in the area. Since the airport was built with Federal funds under the stipulation that no discrimination against types of aircraft using the field be made, the airport ruling amounted to a violation of the Federal agreement.

AOPA's request instituted a series of conferences between airport officials and CAA regional people. Upshot of the conferences was the announcement to AOPA by airport manager, Earle S. Bigler, that deletion of the ruling from the airport regulations was authorized by the airport governing board June 6.

A statement from J. B. Hartranft, Jr., AOPA general manager, lauded the airport's move and indicated that AOPA plans to continue the fight against such discriminatory regulations at other Federally-supported airports.

EARLY ROUNDUP PLANS

AOPA members as far away as Houston, Chicago and New Orleans are already making plans for group flights to the annual AOPA Roundup flight to be held at a seaside point on the eastern seaboard late this summer.

J. B. Hartranft, Jr., AOPA general manager, announced that plans for the flight are in the works. Full details will be issued to AOPA members well in advance of the actual flight date. Nonmembers, Hartranft said, will also be welcome to attend.

Last year's Tenth Annual Roundup flight staged at Rehoboth Beach, Del., drew over 600 personal planes and 1,500 people to break all previous mass-flight records. AOPA expects an even larger turnout this year.

MAPS

On a recent coast-to-coast flight, an AOPA official found that up-to-date maps are scarce around the country. The flight (San Diego-New York) was unexpected, so our staff member didn't have the latest charts from AOPA's map service. Of the 15 charts he purchased during the trip, eight were obsolete.

If you're planning a trip and want to avoid similar difficulty, order your maps through AOPA's Map Subscription Service. (Sample order form is shown below.) Both WACs and Sectionals may be ordered and subscribed to through the AOPA plan.

FIRST WINNERS

First three winners in AOPA's new Pilot Parlay contest are Mary Lou Huff (AOPA 51601) West Point, Ky.; M. R. Powers (AOPA 69017) Blessing, Tex.; and E. W. Van Del (AOPA 61407), Aberdeen, O. The three members were the first to bring five new AOPA members each into the association. They were awarded the "first lap" prize, a handsome Zippo lighter adorned with the AOPA insignia.

The winners are now working on lap two of the first race for five more AOPA members and the sterling silver identification bracelet prize.

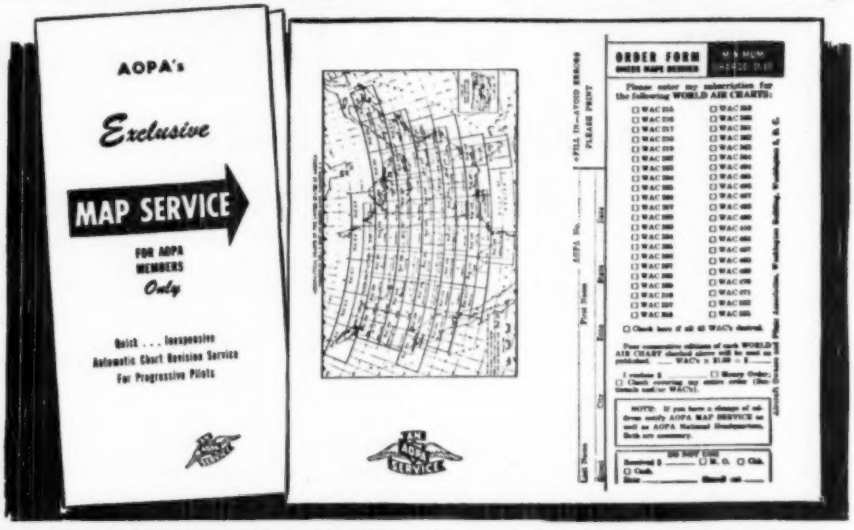
All AOPA members are eligible for the contest and the prizes. With each additional five memberships submitted, the member gets additional prizes. After the first 25 memberships have been turned in and the first five prizes awarded, the member is ready for the "second race" and second set of prizes.

Bonus prizes will be added by AOPA to the regular prizes for the 500th, 1,000th, and 2,000th parlay membership applications received at national headquarters. Applications must be on special parlay application blanks.

AIRWORTHINESS SYMBOLS

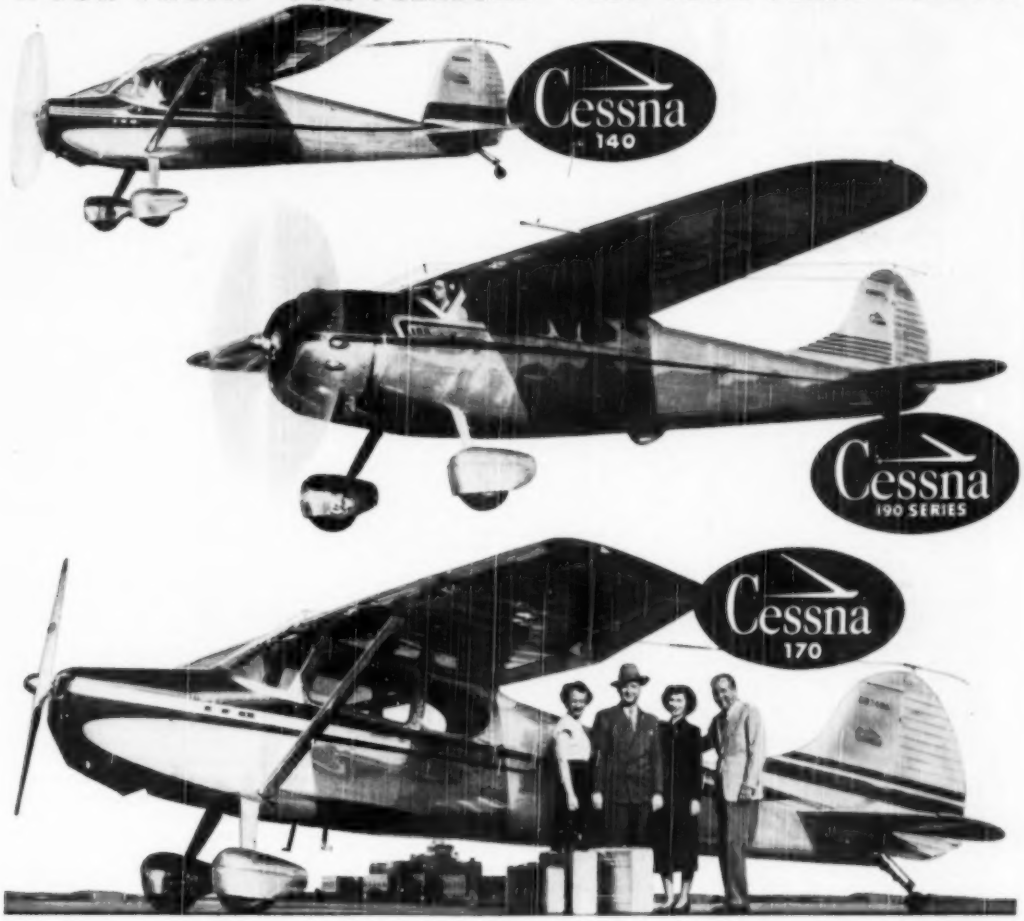
The deadline change for removal of the CAA Airworthiness Symbol on personal planes caused some confusion in the CAA regions. Changing the December 31 deadline for removing letters 'C,' 'X,' 'R,' and 'L' from planes is not yet official although both the CAA and CAB have approved the change and are in the process of getting it made into law. When the law is passed, the revised regulation will drop the December 31 deadline and will only require letters' removal when aircraft are refinished or new fabric installed. But the new regulation will be limited only to planes based within the continental U. S. The December 31 deadline still applies to U. S. aircraft outside the country.

Change in the deadline was brought about through pressure from AOPA in behalf of its members, many of whom would have found the change a hardship.



Map order form (above) can be used by AOPA members to subscribe for latest CAA aeronautical charts.

☆ FOR PROFIT—FOR PLEASURE—PICK YOUR PLANE HERE! ☆



CESSNA-140—CROSS-COUNTRY COMFORT FOR TWO . . . with plenty of room for luggage . . . is yours in the all-metal Cessna 140. Quiet, fast, economical. Easy to fly. You can go where you want when you want...quickly, economically!

CESSNA-170—LUXURY FOR FOUR is what you buy in Cessna's famous "Family Car of the Air" . . . the 170! It's the lowest-priced, 4-place all-metal plane on the market . . . BY SEVERAL THOUSAND DOLLARS. A sensational value!

CESSNA 190 Series—EVERYTHING FOR FIVE! Airline-type engines, airline comfort, shorter take-off, more range, more load, more speed . . . all this plus economical operation is yours in the all-metal CESSNA 190!

COULD YOU USE 400 EXTRA EXECUTIVE MAN-HOURS—without adding to your staff?

Yes, we're offering you 10 extra 40-hour weeks of executive time—during the next twelve months. For that's the amount of travel time even the 2-place Cessna 140 saves on 50,000 air-route miles (57,250 highway miles) of company travel! And a Cessna 170 or 190 will save even more! See your Cessna dealer today and arrange for a practical test of what these planes will do for *you* in *your* business...over the routes you and your men travel. You'll be amazed at how little it costs to own and operate an all-metal Cessna—how much speed, comfort and safety they offer. Only Cessna builds a complete line of all-metal personal planes. There's one which fits your business . . . will save time and money for you.

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LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

THE MICKY WALKER A-BOMB

It is not only the A-bomb that pops off—often it is a military speaker who, if he only knew it, could astonish his listeners by letting them look at him and wouldn't have to partruriate any secrets. Now the newspapers have the story that we have been able to make the A-bomb so small that little airplanes can carry it. So small that, so it is rumored, even artillery guns can fire it. Presumably small guided missiles could carry one 5,000 miles with ease. Russian informants say that Russia has fired dummy A-bombs from submarines in practice.

How is this strange bomb constructed? The way that it is constructed was in the story in FLYING (October, 1949) which disclosed that the Russians had the A-bomb, the story that was the beat of the decade because it informed you of the matter before the President himself made his announcement and before, so he said, he had the information himself.

This general manner of construction of the Micky Walker is also the way that the Russians are trying to make the H-bomb. Further details could not be revealed because of our hallucination about what Russia doesn't know.

Does Russia have the Micky Walker A-bomb too? Read the story for the implications. I couldn't set down the plain facts for fear that the Government would throw me into the State Department.

* * *

MOSTLY ABOUT SADIE

"Why didn't you come over to see me Saturday night?" Sadie asked what she thought was about to develop into a new boy friend. Much to her surprise he replied, "My wife wouldn't let me."

So now, right off the bat, Sadie asks him, "Are you man or spouse?"

* * *

Sadie was telling a friend that she had just got back from a two-week stay in the hospital, and the friend asked her if there had been any complications. "Oh, no," answered Sadie. "I was too sick."

* * *

HERE'S ONE FOR THE BIRDS

Any doubts that aviation is now a part of our way of life can be laid to rest, in view of the fact that a good many birds have taken up the life of the hobo.

In the fancy month of May I buckled on a Dizzy Six and nosed her down a runway at Chicago with the hope of going to Dallas, seeing as how we had aboard some passengers who had been sold on the idea. But I didn't take off because about the time the ship had her ears laid back and was grunting away, our Number Two engine up and died on us, or at least it quit pulling, so we did what they do in Hollywood—we turned it in and got a new one.

The bad airplane was held in Chicago while the mechanics tried to find out what was wrong, but they couldn't find anything so the airplane was sent out 24 hours later on the same trip and again the engine failed on the take-off. This time the boys found out what the trouble was. A mama bird and a papa bird with a well-developed yearning for travel had built a nest in the carburetor intake scoop.

Since then the mechanics have been on the lookout for such things and they have found several more nests, so

it seems like building nests in airplanes is kind of a general condition in the feathered world.

Your reporter looked into this matter and has found out that hoboing among the birds has developed almost to the point where one could call them civilized.

* * *

Two birds were sitting on the fence at the airport.

"Where you goin', Bo?" one of them asked.

"Oh, I'm shaggin' the Arizona run," the other replied.

"Gettin' off the New York route, eh?"

"Hell, yes. Too damn much blind flyin.'"

* * *

This bird business is going to be a little strain on the nerves of our passengers. The flight engineer now has to go around the plane before take-off and squint into that hole on each engine, and when a passenger asks him what he is doing he will of course reply, "Looking for birds, don't you know?"

Well, tweet-tweet.

* * *

EPITAPH

He'd get new tires when the month was through,
But he blew out a tire—and his candle, too.

How Much 'Service'?

(*Continued from page 22*)

slipped past the 23 minute mark.

"Give me a crank, will you?" the visitor asked. So the lineman turned the prop. Two minutes more.

Standing off to the side, Gemende clicked the stop-watch as the ship revved up and started down the runway.

"Twenty-five minutes in all," he said, "and my lineman was kept busy fetching and carrying. Altogether we sold five gallons of gas. Our profit—gross profit, mind you, not clear—is seven cents a gallon. So we grossed 35 cents. That's before I pay salaries. With a buck an hour to the lineman—I'll be lucky to come out even."

It was startling—this factual, stop-watch demonstration. I began to see repetitions all over the nation. Hundreds of private pilots dropping in on hundreds of little fields—and costing the operator dough every time.

Now, Gemende isn't a doting operator. He doesn't pinch pennies and he doesn't stand around clocking visitors. He likes their visits and needs them. But it does prove that the average private pilot doesn't realize how much time he takes up.

Let's put it another way. The private flyer takes a lot for granted—and expects filling-station service when the volume of private planes just doesn't warrant it.

"Maybe," admits Gemende, "if we had the volume we could operate the line on a profit. Perhaps instead of showing you how the private flyer costs us money, I ought to lay the blame squarely on lack of volume. But these are the facts—approached scientifically."

While I watched, a contractor from Arizona let down in an Aeronca *Sedan*. He bought eight gallons of gas, had his windshield wiped, and after a chat, took off for Los Angeles. Eighteen minutes had gone by and the field's gross was 56 cents.

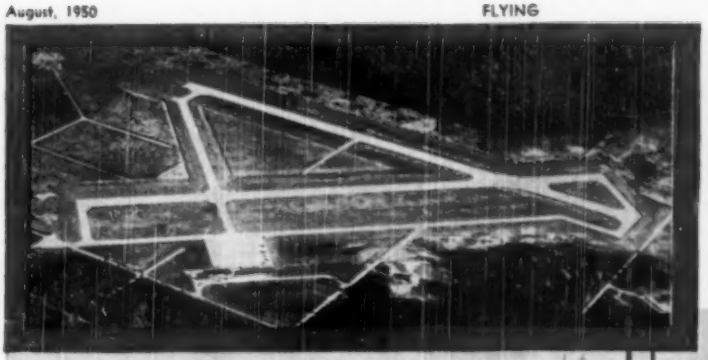
What's the answer? Maybe it's self-service. Self-service gas stations for motorists have sprung up all over the west—and the east too. Why not at the airfield?

That's my idea and I'll take the blame—or the credit for it. It would relieve linemen of some of their non-profitable routine. Of course, the line can be profitable—and is—where there's a big influx of travelers. The thing that tips the scale is volume.

As far as Gemende is concerned, profits come mostly in rentals and maintenance-repair work.

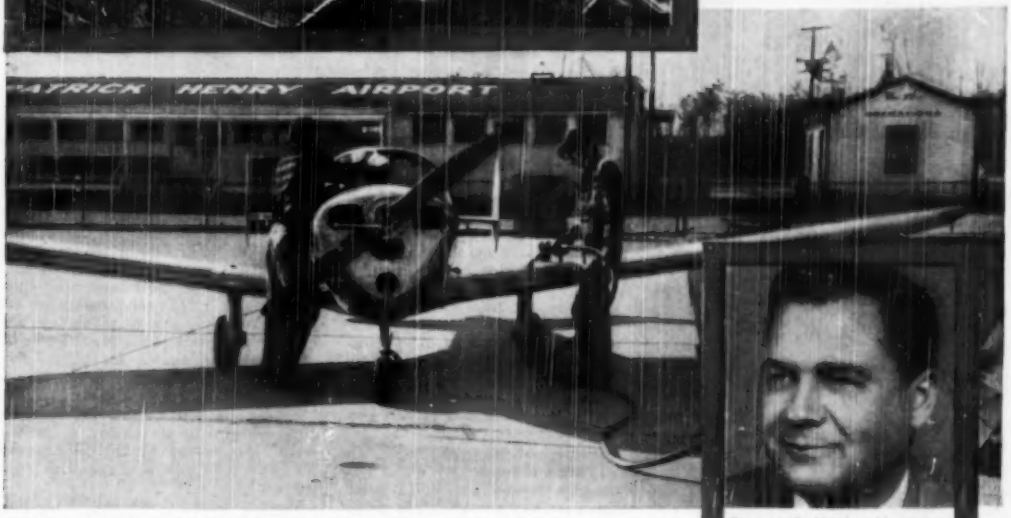
While we watched, three men wheeled a plane from the main hangar. The pilot had spent $1.50 for overnight storage and yet here were three men rolling the ship out. A 10-minute operation putting her in and 10 minutes taking her out. That's an hour's worth of manpower. And a loss for the field, since the mechs get an average of $1.61 an hour.

Gemende's stop-watch has pretty well decided that rental space in big hangars isn't profitable for the private operator. To prove it, he's got four individual



PATRICK HENRY AIRPORT Newport News, Va.

PATRICK HENRY AIRPORT is operated by the Peninsula Airport Commission of Warwick County, Elizabeth City County, Newport News, Hampton and Phoebus.



FLYERS IN A HURRY find that the efficient service at Patrick Henry by linemen T. R. Meacham and J. T. Stanaway cuts refueling time to a minimum.

Eugene C. Marlin, Manager

ANOTHER "ESSO AIRPORT"...FEATURING EFFICIENT SERVICE FOR FLYERS!

COMFORT AND CONVENIENCE on the ground... better and safer flying... that's the aim of Mr. Marlin's efficient management at Patrick Henry Airport.

DEPENDABLE MAINTENANCE and repair facilities... conveniently located hangars... a good restaurant... and frequent limousine service to Williamsburg and nearby communities, are examples of the service you can expect whenever you land at this modern airport.

AND SPEEDY SERVICING *with high-quality Esso Aviation Products is an important feature at Patrick Henry, too!*

PROVED BY MORE than 40 years of actual flying... backed by continuing research in one of America's largest and most modern aviation petroleum laboratories... Esso Aviation Products are famous for dependable performance!

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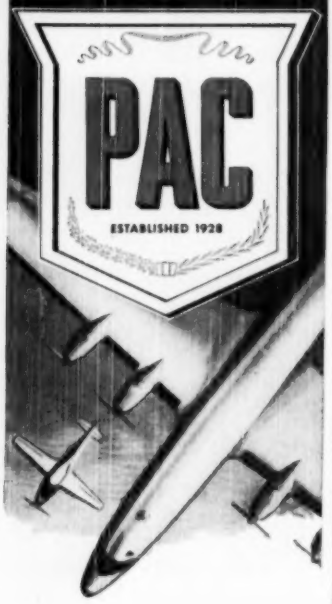

MAMMOTH OR MIDGET

Twenty-one years of experience backs PAC's technicians in overhaul and conversion on military and commercial aircraft. Painstaking accuracy assures your "OPERATION EFFICIENCY"

Authorized Beechcraft and CAA repair station #88

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hangars—which rent for $25 monthly.

"We don't have any worries with these," he says. "The pilot usually wheels his own plane in and out—and doesn't call upon any of the flight linemen for help. It's like owning an apartment house."

Individual hangars also solve the damage problem. It's pretty easy to damage planes in big "boarding-house" hangars. And when there is damage, nine out of 10 times it's the operator's fault and he has to foot the bill.

We walked over to a plane that was undergoing rejuvenation preparatory to relicensing.

"We've guaranteed the owner a wing top re-covering, and all necessary repairs —and that it'll pass relicensing inspections. The total cost won't be above $180, labor and materials. We've figured 10 per cent above our estimate, which is a close margin, but I think we'll make a reasonable profit on this job," Gemende explained.

I noticed the mechs pushing a labor and material card into a time clock. The card was punched every time the mech left the job and every time he began working again. It was Riverside Flight Academy's system for stop-watching maintenance-repair jobs. And a good method to customer satisfaction. It works both ways: cost-accounting for the operator; proof of the labor bill for the plane owner.

"But some repair is deceptive," Gemende said. "For instance, it isn't economically feasible to re-cover an old *Cub*. See that old job over there?" He pointed. "Well, it would cost about $700 for a complete re-coverage—and it needs it. Yet you can buy a used *Cub* in pretty good shape—the same age, of course—for maybe $550."

What Gemende was saying—the same complaint heard from many another operator—is that a lot of jobs have to be passed up because they aren't good bets economically—either for the pilot or the field.

Gemende has the solution, in part, to his own troubles and to those of other private operators. As an old time flyer who learned the game in 1929, two years after he emigrated from Germany, he speaks with a big backlog of experience. He was a weekend barnstormer from 1934 to 1937, came west to California in 1940 as an instructor at Cal-Aero, Ontario, Calif. During the war he was Squadron Commander in Basic Training at Cal-Aero—and spent 5,600 hours airborne. Then, in 1945, Gemende and A. H. Des Mazes, another former Cal-Aero instructor, incorporated and bought the flying field.

"Essentially," says Gemende, "the operators are providing highways for the private flyer." That's the reason he believes that for good fields—just as for top-notch highways—there ought to be some kind of municipal ownership.

He reasons that if towns owned fields like his, for instance, there wouldn't be the heavy tax burden—and aprons and strips could be kept in better shape than the average operator can now afford.

But he believes the biggest need—perhaps private flying's salvation—is for the immediate development of low-cost aircraft. A two-place plane to sell for $1,700 at tops—a four-seater, for $3,000. He's watching the low-priced planes with optimism.

As we left, a plane shunted down the strip, wheeled up for service. A lineman went through the routine: windshield, air in tires, 10 gallons of gas—and information.

Twenty minutes elapsed. The field grossed 70 cents.

"That pilot wouldn't believe you," said Gemende, "even if you told him."

But the facts—tough as they are—were right there, clocked by a stop-watch. END

"Him and his 'genuine cowhide' flying jacket . . ."

His Aviation Career Has Begun...

Quoted from one of many recent letters from NAI-trained Aeronautical Engineers

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THESE MEN TOOK ACTION... and are now profiting from their Northrop career-training.

*Jim R. "Thanks to you for starting me off on this immensely interesting field of helicopters. For your satisfaction and mine, too, J (another Northrop graduate) and I received a healthy raise the 15th of April."

*Robert B. "I wanted to let you know how much I appreciate your help in securing this position. I work in the Missile Flight Test and Analysis Department and am very satisfied with the type of work. Mr. (another Northrop graduate) is also employed in the same department, and Mr. (still another Northrop graduate) of my own class is here but in another department. We're looking forward to seeing future Northrop graduates down here."

*Roy B. "I have been working for (name of aviation firm) and have been putting in some terrific overtime. We manage all the way up to 70 hrs. a week and it doesn't make anyone angry either, with time-and-a-half and double time."

*These are actual quotes from only a few of the letters on file in the N.A.I. Graduate Placement Department. Names are abbreviated out of respect for personal privacy.

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CIVIL AIR PATROL

WING TALK

Reserve Duty Pays Off

FOR interesting inactive duty that pays off in points toward promotion and retirement, Air Force Reservists and Air National Guardsmen should check with the USAF liaison officer at the nearest CAP Wing headquarters to learn how they can serve as instructors with CAP units. Training authorization for this type of inactive duty must come from the Reservist's unit or, if one does not have a training assignment, from the appropriate Continental Air Command AF headquarters. Headquarters, USAF, has directed that Reserve personnel may be attached to CAP organizations on the following basis: To each Wing, one senior air instructor and two assistant instructors; to each Group, one senior air instructor and one assistant; and, to each Squadron, one air instructor.

Cadet Donald Chaney, Missouri, is first cadet to address the CAP Congressional dinner.

CAP's Wartime Mission

A TWO-FOLD wartime mission has been assigned to the Civil Air Patrol by the Department of the Air Force:

Assistance to the U. S. Air Force (1) Maintain a pool of a minimum of 100,000 cadets trained in ground and preflight subjects as a source of personnel procurement for the Air Force; (2) provide anti-submarine patrol on the sea frontiers of continental U.S., Hawaiian Islands, and Alaska, if required by the Air Force and/or Navy, and provide patrol service along the southern border of the continental U.S.; (3) develop an auxiliary radio communications net within the CAP geographic boundaries; (4) participate in search and rescue service as an auxiliary of the Air Rescue Service; (5) provide courier, mail and light transportation services; (6) provide flights for radar tests, tow target flights and non-combat reconnaissance flights; and (7) provide other emergency operations as ordered by the commanding general, Hq. & Hq. Squadron, CAP-USAF.

Assistance to Civilian Agencies. (1) Provide anti-sabotage patrol; (2) provide aerial reconnaissance to assist ground traffic control agencies during periods of emergency; (3) provide patrol of transportation and pipeline facilities, public utilities and natural resources; (4) fly emergency missions for Federal and state agencies and for war industries; (5) assist in providing emergency communications facilities for devastated and/or communications isolated areas; (6) assist in the evacuation of supplies of the civilian population in devastated, isolated or danger areas; and (7) establish CAP flights which will be attached to mobile recovery battalions organized throughout the continental U.S. by the Office of Civil Defense.

Oregon Clinic

CAP's OREGON Wing, commanded by Col. Willoughby G. Dye, joined recently with the Oregon Education Association, the State Board of Aeronautics and the CAA to stage a successful Airport Operations Clinic for some 300 Oregon teachers and school administrators. High point of the Clinic, held as a part of the Association's state convention, was a one-hour orientation flight in planes furnished by Northwest, United and West Coast Airlines. Many of the teachers had never ridden in an airplane.

Maine Hideaway

MAINE Wing's Portland, Brunswick and Sanford Squadrons used Operation HIDEAWAY, a one-day search and rescue maneuver, to test successfully new light-weight air-to-air and air-ground radio equipment developed by local CAP technicians. Maj. Carroll C. Ripley directed the mission from Wing headquarters at Blackstrap, Falmouth.

First Lieut. Paul W. Spencer, South Tucson flight commander, has flown over 250 hours in Arizona on Operation Blood.

Bismarck Rescue Mission

NORTH DAKOTA Wing's crack Bismarck Squadron won state-wide recognition this spring for flying a mercy mission which might have affected the health of an entire community, despite extremely dangerous flying conditions caused by violently high winds. Responding to an emergency call from the Bismarck Public Health Laboratories, the CAP pilots flew typhoid vaccine to the flood-bound city of Mott when health authorities there feared the city's water supply had become contaminated.

Operation Unknown was a special rescue operation engaged in by Boy Scouts of America and CAP personnel April 1.

New Reserve Exec

NEW Executive for CAP Affairs on the staff of the Special Assistant to the Chief of Staff for Reserve Forces, Hq. USAF, is Lieut. Col. Kermit D. Messerschmitt, former PAS&T at Colorado A & M. He replaces Lieut. Col. W. L. Todd, whose new assignment is as PAS&T at the University of Michigan. (MICHIGAN Wing, please note!)

Wing News

FLYING congratulates Colonel Thomas E. Knight's WYOMING Wing for being the first to reach its quota of 500 in the cadet recruiting drive now underway.

MAINE Wing's newspaper, *Wing Over*, reports that the fairer sex has taken over the Rumford-Mexico Cadet Squadron. CO, Louis Cayer, now has 25 high school lassies training in his squadron.

Cadet Claus R. Johnson, 17, recently became the first member of the MINNESOTA Wing to reach the rank of cadet major, a position attained by relatively few cadets.

New CO of the MISSISSIPPI Wing is Col. Joe Rice Dockery, wealthy farmer, businessman and air enthusiast.

A model "disaster plan" developed by the NEBRASKA Wing is being used as a guide by other Wings.

According to CAP reports, 55 of the 65 students attending Carson, Nev. High School, are members of CAP.

Nearly 400 senators and representatives attended CAP's Congressional Dinner in Washington, D. C., May 25.

Lieut. Wanda Stewart is the first woman to become a squadron leader in the COLORADO Wing.

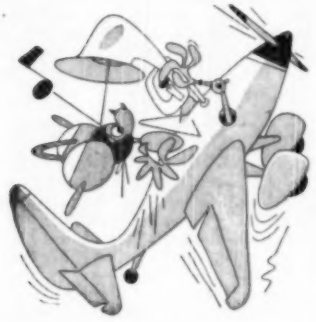
PUERTO RICO Wing, CAP's newest, is commanded by Col. Orlando J. Antonsanti, prominent San Juan attorney.

The Birdmen's Perch

No go too slow, too low!

Stalls are bad enough anytime, but at low altitudes they're poison. No matter how interested we get in the scenery, it's no fun to see it coming up at us so fast!

That's why we're so hepped up over a



new device we read about that's going to sell like hot cakes if pilots are the smart guys we think they are.

It's an automatic stall reminder—a horn that lets the pilot know when he's about to go into a stall. That's for us, Brother, and it should be for you!

Sorry we can't give you more info at the moment, but suggest you make some inquiries yourself. It's our bet that this little gadget is going to prevent the ruination of lots of nifty little ships and plenty of pilots.

In our book, it's an A Number 1 necessity!

MAKE WITH THE COMMERCIAL, FERDIE!

But if you gotta stall, do it on the ground and in front of that fancy orange and blue "GULF" sign!

The good-looking fellow in the coveralls is just dyin' to fill your crankcase with a product he's been plugging called Gulf Aviation Oil—Series D!

Did we say product? Why Gulf Aviation Oil—Series D—is practically an institution, the world's finest detergent dispersant oil for horizontally opposed engines.

We don't want to brag, but Gulfpride is the only aviation oil put through Gulf's exclusive Alchlor process to remove those extra carbon and sludge formers.

Great Scott, Man, get some! Increase those periods between overhauls up to 100%!

LITTLE KNOWN FACTS DEPT.

What! You never heard of Donald Van Landuyt, 1420 West 10th Street, Bend, Oregon?

Well, you will from now on because Don has just earned great distinction and a shiny new Commission of Perch Pilot (bottom rung, of course) for submitting, with PROOF, a Little Known Fact that may account for the paper shortage! To wit:

Blueprints required for a big Air Force bomber would cover 125 football fields!

Fine, Don, absolutely fine! It's facts like these that restore our faith in football. Now—be a good fellow and tell the other boys and girls how much fun it is to be famous.

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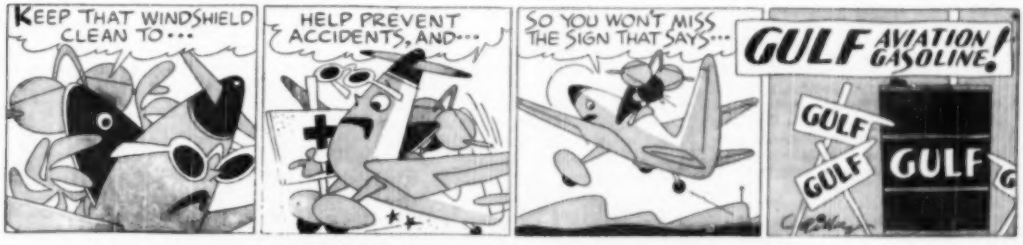

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I Learned About . . .

(*Continued from page 34*)

off run, we grounded on a submerged sandbar and it was three hours before we got off. Full throttle wouldn't budge the plane, and it took extra manpower arriving by rowboat to get us afloat again. By that time it was too late to go on to St. Paul and we secured for the night.

Departure the next day was uneventful. The gas level had not dropped noticeably so we didn't put any more in. The check went as before, except that in turning on the gas we put it on the left tank. The take-off was quick and we were on our way. When the left tank ran dry, we were well beyond our half-way point so we figured everything was rosy. Not until some time later, when the right tank gauge was bouncing around the quarter instead of the half mark, did we understand our predicament. The full-throttle work on the sandbar had been done on the RIGHT tank and we had started today's flight on the LEFT tank. When the tank ran dry we were not half way through our fuel supply as we supposed; we were closer to two-thirds through it!

We then tried to recall just how long we had used power on the sandbar. It hadn't seemed very long at the time but there was that gauge, much lower than we thought it should be, even with the extra gallon in the tank. Previous experience had shown us that the engine kept running for nearly half an hour after the gauge read "EMPTY," so after checking the map we decided we could still make it.

Just before sighting Minneapolis, we passed over a private seaplane tied to a float. We debated landing for gas but since the needle was still bouncing above the line, we figured that we had well over half an hour. That was more than we needed, so we kept going.

The Continental was still purring when we got over Logan Field, and after a couple of circles to size up the pattern, we started down. On the downwind leg across the river from the field, the engine sputtered and quit. We switched back to the left tank and got only a couple more sputs followed by silence. There was nothing to do then but come on in dead stick, which we did, setting down neatly into the 20-mile wind.

We immediately unshipped the canoe paddle and tried to reach the river bank by the airport, a tantalizingly short distance to windward. But the wind was too much for us. Despite our best efforts, we found ourselves drifting toward some coal barges on the opposite shore.

Then things really got bad. We were moving tail-first toward a barge at a rate that would smash the Luscombe's tail if we hit it. Paddling cross-wind to miss the barge would bring us up against a high dike, which was even worse, since there was no way we could hold the plane off of it.

Choosing the barge as the lesser evil, we prepared to come alongside as best we could. Bill stood on one float and paddled like mad to turn the ship broadside to the wind with its wing overhanging the barge. I stood atop the wing (it was metal, and could stand such treatment) and then dashed along it to the barge, where I grabbed the wing tip and held the plane away.

Bill scrambled ashore and after a council of war, we decided he would go after gas while I held the ship against the wind. It would take him about 10 or 15 minutes, we figured.

If you've never held a floatplane against a 20-mile wind, you've got a new experience in store. The first 10 minutes weren't too bad. I braced myself—and looked for Bill momentarily.

But the 10 minutes stretched into half an hour. My back muscles began to ache, and my legs cramped. The plane almost got away from me a couple of times and drifted rapidly toward the barge before I got it stopped again. Sweat popped out on my forehead—and my shirt clung damply. I had visions of a major catastrophe: a beautiful new Luscombe with a dented—maybe smashed—fuselage.

After 45 minutes, I figured the jig was up. I was exhausted and the plane seemed to weigh 20 tons. Could I last it out? Finally, over an hour after he left, Bill came puffing back with some auto gas. With the help of the coalyard attendant who accompanied him, we fired up and cleared the barge, and lost no time in taxiing to the seaplane float.

That hour's battle against wind and wave was exhausting work, but it left plenty of time to contemplate our errors. We hadn't been consistent in our "fly-one-tank-dry" system, having made our second start from Bismarck on the left tank instead of the right. Second, we hadn't bothered to make an accurate check of the fuel consumed on the sandbar, nor did we make any effort to replace it. And, when we were not certain of our remaining fuel supply, we pinned our faith on a gauge of questionable accuracy and passed up a refueling point where we should have landed. Finally, knowing that we were down to our last few drops of gas, we spent too much time looking over the landing area before coming in.

It was a lesson we had to learn sometime, and considering the errors involved we were fortunate to have learned it as cheaply as we did. END

"And There I Was . . ."

Before the days of the Ferry Command, ferrying flights were considered pretty much as vacations and most of the "per diem" pay went into one or two well-rounded jugs to liven up the evening's RON.

One morning after an unusually hectic evening, two of the pilots walked slowly toward the flight line and as they passed, I heard one say, "You know, it's not the landing itself that bothers me—it's that horrible rolling to a stop!"

—Maj. Eric D. Schwarz, USMCR

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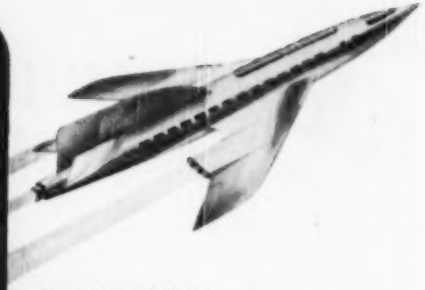

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BETTY SKELTON'S NOTEBOOK

RAT RACE

This year's Indianapolis Speedway turned out to be more exciting at Bob Shanks Airport than at the race track, only a few blocks away. *Stinker* and I arrived from Florida just in time to get in the rat race around the small grass field. Over 700 planes landed between 8:30 and 10:00 the morning of the race—and there was no tower or control of any kind! ARNO SIEFKER, operator of Gas-o-larium on the field, said all the private pilots really did a wonderful job in complying with safety rules during the terrific traffic jam.

Just learned that SQUEAK BURNETTE, a hot aerobatic pilot before the war, has retired from the Air Force and is living in Lynchburg, Va. Squeak is the boy who flew a Travelair inverted underneath a ribbon between two poles at the 1938 Miami Maneuvers. Top aerobatic pilots now have a new cause for worry—Squeak has decided to enter the 1951 International Aerobatic Contest . . .

DOWN AT CRAIG FIELD

Of course I know that none of us ever gets LOST on a cross-country, but if you *just happen* to be "temporarily confused" when you land at Craig Field in Jacksonville, Fla., KEN BRUGH has made sure you'll know where you're going when you take off. Ken has put up a terrific sign near the gas pits that gives a number of headings and mileage figures—in fact it does everything but fly the course for you!

Comedy flyer DAVE BINNS of Columbus, O., looked at the sign for a moment, then drawled, "This is swell . . . but I'm afraid those headings would never work *for my* plane!" One look at his contraption—an old, stripped-down Curtiss pusher—and you know what he means. It has no fabric on the fuselage, no floor board, no nuthin'.

Dave has to wear hob-nail shoes to keep from falling out when he's in flight. And the hob-nails change his compass at least 30°—depending on whether his feet are up or down! But that doesn't stop Dave—several times he's flown over 2,000 miles to participate in airshows.

Owners of midget racers are really keeping busy . . . The Michigan Air Fair at Willow Run Airport in Detroit will offer top money for the midgets (August 11-12-13). LARRY ZYGMUNT, Chairman of the Air Race Committee, is busy taking entries for the Continental-sponsored event.

CHARLIE LOGSDON, Chairman of NAA Contest Board in Washington, tells me that Continental has definitely agreed to sponsor the $25,000 midget races at the National Air Races in Cleveland, postponed to May 19 and 20, 1951.

GRIN AND BARE IT

Life's little embarrassing moments . . . and this time the joke's on me! May as well admit I learned to fly without the assistance of shoes, and still enjoy flying without them. During the huge Armed Forces Day show at MacDill AFB, I handed my shoes to the line boy and asked him to be sure to meet me the second I landed. You guessed it . . . as I rolled to a stop in front of the announcer's stand—no line boy, no shoes. After waiting in the plane as long as I possibly could, was finally forced to climb out—minus footgear—in front of 100,000 spectators. Guess I looked rather pitiful because one woman in the crowd sent down a donation to help "that poor little girl who can't even afford shoes . . ."

Betty Skelton

Cockpit Hypnosis

(Continued from page 29)

the marker beacon, the flashing stopped and I knew what it was . . .

—TOM MATTHEWS

"My Eyes Never Close"

About 15 years ago I started cultivating corn with a tractor, and I experienced some queer sensations while going up and down those rows of corn. During the war I encountered the same feelings when I sat in the cockpit while flying some of the long NATS trips.

Now I'm back on the farm and always take a thermos of coffee to the field to keep me awake. It isn't quite like going to sleep—sometimes my eyes never close. It is definitely a sort of auto-hypnosis. Several persons have laughed at me when I tell them about it. Your article has convinced me that I've been thinking correctly. . . . —H. J. (BUD) GRONEWOLD

Smooth Air, No Moon

. . . I've been flying military aircraft for over nine years. . . . Recently, on a flight from St. Louis to Chicago, the night was very calm—no wind, smooth air, visibility unlimited, no moon, and just enough high thin overcast to block out the stars. . . . I used slow cruise settings, and after I got to Chicago circled the city a few times before going out to O'Hare Field. I have been into O'Hare approximately 20 times in the past two years, and am very familiar with the runways and layout in general. However, when I called in for landing instructions and received them, I not only lined up for the wrong runway—but flew the pattern exactly opposite from what it should have been! . . . Once on the ground, I couldn't remember the taxi-way system and had to call the tower for instructions. I even muffed their instructions on one turn and had to be corrected on that. I believe you are quite right in your case for cockpit hypnosis. —CARL R. SPROAT

Everyone Hypnotized?

During the war I was a B-24 radio operator. One run (from Natal to Dakar), we were about three hours out of Natal, when I suddenly heard the ground station calling me. I had to ask the station to repeat three times before I got the message—bad weather. The ground station had been calling me for five minutes—but I remember hearing just faintly, and had evidently been semi-hypnotized. When I handed the message to the pilot, I found him "asleep." Then I checked the co-pilot; he was "asleep" too. When I crawled into the nose section to find the navigator, he was leaning on his table and seemed to be studying his maps. I yelled at him. He jumped and shouted, "What time is it?" He had been asleep (or whatever you want to call it) for 25 minutes! After checking with all crew members, I found we had all been "asleep"—the plane had been flying on autopilot.

. . . On a later night flight, we got a straight-in clearance from the tower. The pilot went through his check as a matter

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Now! EVEN MORE UTILITY, ECONOMY, PERFORMANCE IN THE 1950 PIPER MODELS

THE FOUR-PLACE 134 MPH PACER

You'll be proud to own the Pacer (shown above) not just for its outside beauty and smart interior styling but because you can "walk by" most other personal airplanes. The Pacer cruises up to 134 mph! Economical "115" has 115 horsepower, soft-riding Hydrasorb landing gear, front and rear doors, two 18 gallon wing tanks. Models "125" and "135" have 125 horsepower, flaps and added sound-proofing. Prices start at $3,295.

THE SENSATIONAL SUPER CUB

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of routine. The final was as smooth as silk and just as the co-pilot turned on the landing lights, the pilot woke up. He had forgotten flaps. He yelled to the engineer, and got the flaps just as he hit the runway. The plane took a bounce like a golf ball . . . but the next time around the pilot made a perfect landing.

—HUNTER L. BOICE

Were We Mesmerized?

. . . In the Central Pacific, I was returning after dark from a long, over-water mission in a B-25. I had been concentrating steadily on the instruments for perhaps two hours, and when we reached home base I was tired and groggy. On the downwind leg, at 1,000 feet, my co-pilot gave me full flaps when I called for wheels down. I recall that for what seemed a long time I could not understand why I didn't see a wheel on my side—and yet had terrific deceleration. After the truth finally sank in, I dropped the wheels and raised the flaps in one swoop, and we dropped at an alarming rate to about 400 feet. . . . After we were on the ground I really got upset wondering what it was all about. Now I think I know—I might have been "mesmerized" and so might the co-pilot. He couldn't offer any explanation for his action. . . .

—JAMES A. DOHERTY

Anoxia and Hypnosis

. . . Regulations on our bases in India called for oxygen above 10,000 feet during daylight and above 3,000 feet at night. After a couple of months of flying the Hump I felt I needed the mask from the ground up.

. . . Very few pilots were willing to wear the masks any more than was absolutely necessary and the ones who displayed the poorest judgment were the ones who were most careless with the oxygen. One captain with whom I rode kept his mask off about one-third of the time, and he missed an instrument approach in daylight. . . . On the final turn into the field he almost scraped a wing-tip. It was so close that the radio operator and crew chief noticed the bad landing. He may have been under the influence of hypnosis but I think lack of oxygen was the more important cause. . . . There is no doubt in my mind that anoxia and hypnosis, as they apply to pilots, are closely related and interdependent.

—JAMES F. CROOKS

Fifty Per Cent Hypnotized

. . . We had been flying almost constantly since 8 a.m. when we decided to land at Mojave. . . . A downdraft plus a light headwind seemed bent on pushing us straight down. My thinking about this time was "okay—so what" so we went down, heading right for the broad main runway. Over the edge the plane seemed to speed up and about midway down the strip it moved sideways to the northeast. I applied power and climbed up, made a right-hand pattern and tried again—again the strong wind from the south. I recall it annoyed me but did not seem to impress upon my dulled brain that the surface wind was different than the higher winds—or that the wind had changed.

So I swung around again and made a longer approach. . . . Just as everything seemed lovely, again the powerful cross wind. After gaining perhaps 300 feet, I inadvertently turned downwind and my airspeed dropped to 40 before I realized it. There must have been a very steep wind gradient. I nosed the craft down and did pick up some speed, but by this time the desert was coming up to meet us. I pulled back on the stick and stopped thinking. Next thing I remember, I was hanging upside down in the safety belt . . .

During that hour I had been at least 50 per cent hypnotized: five easy hours in the air is not a proper prelude to landing at Mojave under the worst conditions the local boys had seen in five years.

—FRED A. CARPENTER

NO PIKER

THE DARING young man on the flying trapeze was a piker. He wasn't so daring. And his trapeze wasn't flying.

That's the opinion of a woman who ought to know.

Twenty-four-year-old Marylin C. Rich earns a living by performing aerial acrobatics 500 to 600 feet above the ground—without a net. Her trapeze is secured to the undercarriage of a helicopter.

"The job's more arduous than dangerous," she says. "And why have a net? That high above the ground, with the wind tossing you about, you'd probably miss anyway."

"Only a Faint Recollection . . ."

. . . I am not an old timer, but neither am I a raw beginner and I have done enough night and radio navigation to have a pretty good idea of what I'm doing. However, on a recent night flight (with a solid overcast at 1,500 feet, visibility about five miles in haze and smooth air), I made a stupid mistake that I still can't explain. I was flying down the north leg of the Cincinnati range (VFR) when, instead of a steady hum which was the last thing I could remember hearing, I was getting a wild, screaming, solid "A." I corrected—more or less automatically—after a quick look at the map. The only trouble was that I was not getting any closer to the beam and I had not been in the air long enough to get too close to the station. I finally woke up and realized that in spite of having checked the map, I had turned left instead of right. A little checking with some of the other beams in the area proved it and located me very nicely about 25 miles off course to the left. . . .

Later on I had absolutely no recollection of passing from the on-course signal to the solid "A," and only a faint recollection of the first corrective measures that I took. I might add at this point that I had been flying all day, much of the time on instruments and by radio. . . .

—BOB WASSON

In Autos Too . . .

. . . I'm a private pilot with only daytime experience, and fortunately have had no hypnotic worry with my flying—but I believe you're right, and that your theory applies also to auto accidents.

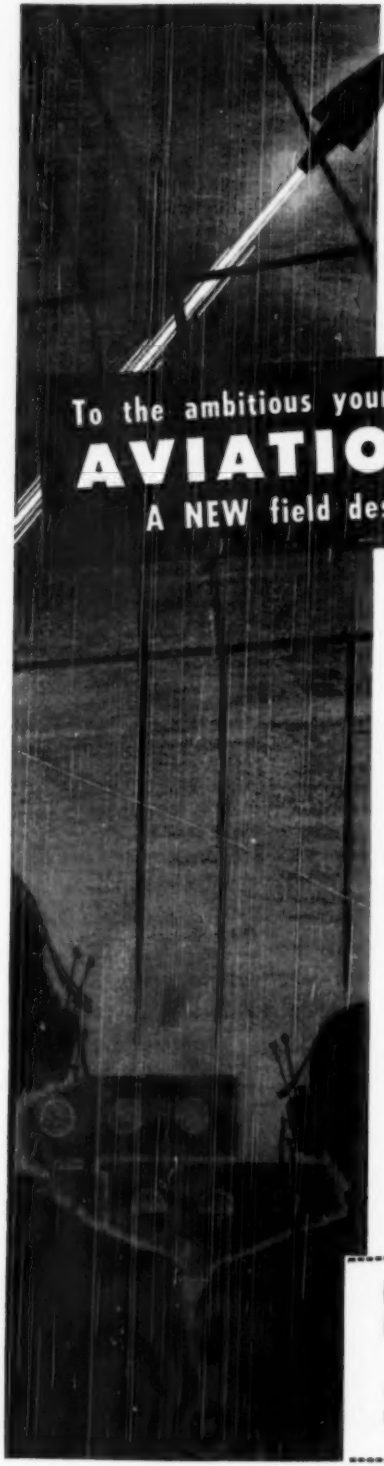
Driving from Pennsylvania to North Carolina several months ago, I left the Pennsylvania Turnpike at dusk in a heavy rain. It rapidly turned dark, as well as wet and foggy. I finally stopped straining my eyes and stopped passing cars, having decided I would prefer to follow one, using his red tail-light as a guide. After a half-hour or so, I suddenly "woke up" to realize, seriously startled, that I had been completely unaware of myself or my driving. . . .Only God had kept my fiance and myself from harm during that time.

—ELEUTHERA MILLER

★ ★ ★

Some letters contained helpful tips, supplementing Hy Sheridan's suggestions for preventing cockpit hypnosis. Among them were the following ideas:

- "Try knee bends and squatting. On long hauls, pull knees up under chin and put feet on pilot's seat while flying the plane with wheel only."
- From a radio operator: "On B-24's, I would tune a code signal, turn it up to maximum volume and run it through the intercom system. Sounds of different frequency seem to do the job."
- "One remedy: fresh, cold air. I also suggest that instruments be painted different bright colors to relieve the monotony."
- "Before entering the pattern, slap yourself in the face several times."
- "While hypnotized, I was given the post-hypnotic suggestion that it would be impossible for me to become hypnotized at any time while driving a car or piloting a plane."
- "Get plenty of rest before a night trip, and don't eat too much—and don't fly in an over-heated cockpit."
- "As a preventive, I have resorted to singing at the top of my lungs."
- "I have found that by pressing my forehead to the cockpit window I can wake up a sleeping brain through the vibration from the engines." END



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Insectonautics

(*Continued from page 27*)

an experimental model in which one fly was mounted on the fuselage stick of a biplane, and another fly was mounted on the center rib of the upper wing. When the upper engine was "out" the lower engine pulled the plane into an impossible climb, and when the lower engine conked, a steep, fast, and usually damaging dive resulted. The only interesting performance of this model occurred when both flies landed on a wall, and walked up it, with the plane sticking out at right angles.

Schwab and Elgin once tried a fly-powered model outdoors. With no knowledge of their fly's power, they put too husky a motor on too small a plane—and saw their model disappear in a matter of seconds. The Horsman's, however, stayed indoors even when they found a horsefly with a wingspan of well over an inch. They estimated his horsepower and built a model with a 6.75-inch wingspan. Then they installed *Tabanus*, technical name for the horsefly, in the engine room. He performed well but didn't seem to give a damn.

On his third flight, *Tabanus* squared away and headed for a light space in the overcast. This turned out to be a window and he ploughed into it full throttle. Ordinarily, it wouldn't have hurt *Tabanus*, but this time he had the plane's weight behind him. He fell to the windowsill, lay buzzing for a while, then conked out.

The Horsmans supplied the planes for the party where Mr. Stanton achieved his fame. Guests brought their own flies, and followed the advice of Henry L. Poole (B.S. in Agriculture, University of Kentucky, 1915), in handling the engines. Because flies are sluggish in cold weather, it is advisable to put the flies in tumblers and the tumblers in a refrigerator for about 20 minutes. When removed, the flies can be poured out on a table and picked up with balsawood "tweezers." To apply them to the plane, put airplane cement between his fuselage and that of the aircraft.

To ready the engine for operation, breathe several times on the fly. That restores body temperature and activity. Then a slight breath on the fly's rear will excite him. He starts his wings and the flight is on!

Making models is a job for a skilled engineer. I used triangular wing designs at first, with soft balsa, 1/16th-inch sections as the structure. I pinned plans to a soft pine board, and over the plans pinned transparent waxed paper. It's easy to shape the wings by sticking in pins at intervals. I cut ribs for curved wing surfaces from soft balsa, and fastened them with airplane cement. In larger wings, these shaping ribs also serve as spacing ribs. Microfilm is available commercially at model stores. Drop a few drops on a bathtub of tepid water. When it has dried, lift it carefully on a wire coathanger. Slightly wet one side of the wing and tail surface framework and lay it on the microfilm sheet, using a hot wire or a burning cigarette as a knife to cut the microfilm away. Then cut the wing frame in the center and lift the outer ends until the proper dihedral is obtained. A drop of cement in the cuts will hold the wings in this angle, and it can then be applied to the fuselage. Warping can be corrected by twisting the wing and holding it until it stays in position.

A sensational, and common, fly motor is the Blue Bottle or Blow Fly, the shining, buzzing, active fly that inhabits cool basements. For noise and action, he can't be beat. I checked with the Department of Agriculture and discovered the serious insectonaut can raise his own engines. Place a piece of meat in the hot sun for a day or two, and then cover it with a screen cage. Keep the ground in the cage slightly moist and in a short time you will have a cage full of buzzing, bumping, brilliant blue engines. They give realistic performances because in proportion to their size they are as noisy as any of our man-made airplanes.

For a big job, get a Sphinx Moth. They come from tomato and tobacco worms. You might raise one by placing a wire screen over a plant. This moth, which can hover like a humming bird or fly backward and forward, is a strong flyer. His wings beat 72 to 90 times a second and his wing loading is .2140 pounds per square foot. A large one would handle a plane of 10 to 12-inch span.

If you're thinking of going into the sport, here's some advice. Spend some time first taking a woman's wrist watch apart and putting it back together. Or count the hairs in your shaving brush. Or separate some green atoms from the pink ones. With a little patience, you'll become deft enough to make the tiny planes and handle your engines. END.

Instructor's visibility was restricted in AT-6.

Repositioned seats in T-6G give both instructor and student better visibility.

STREAMLINED TEXAN

CADETS AND INSTRUCTORS are happy about the visibility in the latest North American *Texan*—the T-6G.

Forward visibility from the rear cockpit, where the instructor "holds classes," has been improved by increasing vertical seat travel several inches upward, and by lowering the instrument panel. The student's seat has also been repositioned. Old AT-6 (top cut) and new T-6G (bottom) are shown above for comparison.

Other features of the "remanufactured" version of the famous training plane: standardized cockpit arrangement, complete radio control in both cockpits, 30 gallons greater fuel capacity than the older *Texans*, new square-tip prop for lower noise level, steerable tail wheel.

Top speed is 212 m.p.h. and service ceiling is 24,750 feet.

The Air Force has contracted for 330 of the modernized North American trainers.

North American T-6G is a modernized version of the famed World War II trainer.

Virility

(Continued from page 19)

Mr. Weaver, one of Dr. Schein's range riders.

"Oh, yes," he said. "You're not dense at all, you know."

When a cosmic ray hits a heavy atom all kinds of particles are shot off and some of these have a great deal of energy, too, and so the incident ray may be multiplied as much as 100 times, and one or more of the secondary, or shower, particles may hit still other atoms so that the multiplication can be as high as 10,000, although this is rare.

Some of the energy of the incident ray is converted into high frequency photons, that is, into very penetrating X-rays, and everyone knows that enough dosage of X-rays will make a man sterile. Neutrons are released, too, and the effect of a good dosage of neutrons is to make a man radio-active—every man his own X-ray tube—but that is not likely to be a satisfying substitute for the other activity that he is going to miss.

When it comes to cosmic rays, metal plates do not shield. Rather, because of the shower or burst effect, they have the opposite influence, causing a multiplication of all kinds of radiation. Of course, if a ray makes a direct hit upon one of the atoms in a man's body a shower or burst can be caused but since most of our atoms are light ones the production of secondary radiation is not so great.

The pilot of a high flying airplane is surrounded by metal plates, the skin of his aircraft and even his armor, and as he sits up there communing with the heavenly bodies, but no doubt worrying about another kind, gobs of these cosmic bullets going 550,000 times as fast as a rifle bullet shoot through his carcass. If there are enough of them he will be made sterile and in time impotent.

If you will ask your physician he will tell you that the records of the medical world show that nothing will break a man's mind down more quickly than the fear of impotency. Why man should worship this particular, or not so particular, Muse, who in the end forces him to labor when he could fish instead, no one knows.

First of all I interviewed one of the most famous medical men in the world, Dr. Andrew C. Ivy, vice president of the University of Illinois. Dr. Ivy was director of medical research for the U. S. Navy during World War II and he is an authority.

I told him the story about the new bogy in aviation. I have taken some liberty with the verbiage of the quotes for the reason that scientific dialectic not only is ponderous to us laymen but often seems dry and lacking in drama and riposte.

"Dr. Ivy," I asked, "are cosmic rays a real threat to the potency of pilots who fly frequently at high altitudes?"

"Nonsense," he said, "there are not nearly enough cosmic rays to matter. The dose is much too small."

"How much would the dose have to be multiplied to have any significant effect?"

"Ten thousand? A hundred thousand? No one knows. Some research people think that the effect of the slight cosmic radiation that we do get is, if anything, stimulating, like a little ultra-violet radiation, say." (Don't leap into your B-36's, boys, until you have finished this story.)

"Didn't someone propose some years ago that cosmic rays were the cause of our aging?" I went on.

"Oh, yes. Some rocking-chair scientist. No evidence. The fact is we know nothing of the aging process as to its fundamental causation. Your cells are constantly being replaced by new ones, you know. While a man may be 60 years old, the average of his active cells may be only around three years, or less. His cells are young, but he is old. We don't know why."

"Well, doctor, I thought that cells are never created, but one cell splits and becomes two, and in that sense all cells are old."

"Oh, that is true enough. When a child is conceived or born there are no cells that are new. Each of your living cells is as old as life itself. None now alive has ever been dead. A baby is as old as the first cell would be—in fact, he is

(Continued on page 52)

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Light plane pilots agree that Hallicrafters S-72L is a
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the radio beams, receive landing instructions
from airport control towers, and to keep posted on
weather conditions. AND, when the flying is over, it's
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picnics, and other entertainment.
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Frequency band, 175 to 420 kc;
also 540 kc to 12.5 Mc. Jack for
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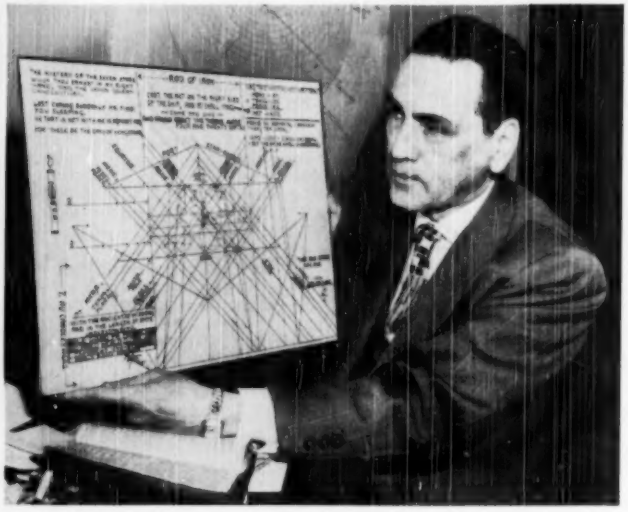

A MYSTIC AND HIS PLAN

MAP-MAKERS never have been able to square the circle. So far, it's been impossible to depict the surface of the earth on a flat sheet so that compass bearings and distances between all points are accurate.

But a Washington, D. C., inventor, William Kendrick Hale, says he's been able to square the circle for years. He does it by using a complicated system involving mystical numbers from the Bible (see cut.)

His method, if accurate, could greatly simplify air navigation. The Institute of Advanced Studies at Princeton is reportedly checking the accuracy of Hale's revolutionary mapping ideas.

the first cell, so far as we know.

"You see," he continued, "when a sperm cell and an ovum cell, to use your nomenclature, get together, there is somehow a renewal of vigor. We don't know why."

"And there is an urge for them to get together?"

"Yes. One of the strongest of all urges. We don't understand that, either."

"Well, that is what my story is about, Doctor Ivy. I hope you don't mind."

"Dear me, no. I study facts, not philosophies. The purposes of Providence I leave to Providence, and a very good place for them, too."

"Then cosmic rays are no threat at all to our high altitude pilots?"

"No, but the fear is; the fear is a very great threat. The power of an idea is tremendous."

"The power of an idea. Well, I guess it works both ways. When a girl says that a man is getting ideas, she is really quite scientific, isn't she?"

"I wouldn't think that she would need to be," he mused. "I am not concerned with such things. I am a scientist of sorts, not a writer." Hm. Well, a writer has to make his researches too, and as for me I don't begrudge the time.

That seems pretty well to take care of the cosmic threat, but there is a growing body of low-flying pilots who have heard that the effects of ordinary flying, the changes of pressure and of oxygen, are to them what water is to a firecracker. So I set about cornering an able and outstanding flight surgeon who has dealt with such gentry for a long time. He is Dr. Herbert F. Fenwick, who has been a flight surgeon for 23 years, first in the Air Force and later for the Civil Aeronautics Administration, and who is now also the head surgeon for the Air Line Pilots Association.

"I don't want any hokum, Doctor Fenwick," I pleaded. "I want the low-down."

"I'll give it to you," he agreed. "I'll give it to you downer and lower than you can get it anywhere else."

"All right, doctor. Does ordinary flying have any bad effect upon a pilot's virility?"

"Not in the slightest. Some of the most virile boys I know have been flying for years."

"How about not enough oxygen—anoxia?"

"The ordinary pilot in good health gets plenty of oxygen. Harry Armstrong, head of the medical department of the Air Force, you know, found that at 7,000 feet the blood is saturated with oxygen, and that is all that you can take up, even if you breathe the pure stuff. Of course, if you ruin your health by too much flying and not enough rest it is just the same as though you ruined it in any other way; flying is not a special case."

"Tell me, doctor. I know that pilots have told you their most intimate troubles. Have you run into any complaints of impotency?"

"No, indeed. In fact it is quite the opposite."

"Great Scot! The opposite?"

"Well, yes. I have had a good many complaints from the women, and now that I think of it, a surprising number of them, too."

"Doggone. A funny complaint, I must say."

"Oh, not what you think, Hy. A wife will come in and say that she knows darn well that her husband is trying to enlighten a good many other girls when he is away on his trips, and she wants to know if there is anything that can be done about it."

"And what do you tell her?"

"I just tell her to cancel him out before he leaves home."

"How?"

"Are you going to print this?"

"Sure."

"Well, then . . . hm . . . I tell her to consult her feminine intuition."

"Does that work?"

"As a doctor, I have some confidence in the method."

"Then the fact is, doctor, that the flyers as a whole are, far more than the average male population, are . . ."

"According to my observation, I should say so."

"How do you account for that? Do you think that they are stimulated by the factors that they have lately been fearing?"

"No, I don't think so. I think that it is easily understood just so soon as we realize how powerful the mind is. The fear of impotency, of your cosmic rays and your anoxia, can make a man as impotent as if you shot him. And so it is no wonder that the opposite effect is true. Nothing will brace a man's potency like a woman's admiration. Pilots used to be, and to some extent still are, like knights of old, daring and spectacular and romantic, and so women have lavished admiration upon them, and the reaction has been normal."

"Not far from lavish to ravish, huh?"

"Well, nature, you know. . . ."

"Yeah, doc, I know."

"At any rate, and you can quote me, pilots have nothing to hang their heads for on this score. Cosmic rays and changes of altitude have had no harmful effects up to now, none along this line at any rate."

There you have Doctor Ivy and Doctor Fenwick, and the record, too. And, so, merry pilots, take heart. You are still enslaved in those feminine toils. Nor your purse, nor your time, nor your thoughts can be free. Across the distances, ever decreasing, let us hope, cell speaks to cell, in a language that can be understood by all but none can translate.

Cosmic rays are no threat at all, and have caused not the slightest slowing down of man's splendid gift. Of this you can be sure.

So, to the ships, men. Hey, men, the ships are *this* way. END

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Gas Turbines

(*Continued from page 21*)

You may rightly ask: "Why show power ratings at 20,000 feet? What does the private pilot care about such altitudes?" Pressurization has not been applied to small aircraft design largely because of complications inherent in such a system. But the gas turbine makes relatively simple the tough problem of air-conditioning a small airplane. An air bleed line from the turbine compressor, and proper fuselage structural design will make possible airline comforts for the lightplane, with little increase in weight.

Executive planes will be able to fly over the weather in many cases. Small planes will gain a freedom of operation unknown to today's light aircraft. Pressurizing to three pounds per square inch would allow an 11,000 foot cabin altitude with the airplane cruising at 250 m.p.h. (or more) at 20,000 feet. Actual service ceiling of a twin-turbine executive type would be over 30,000 feet.

The power requirement for speed, of course, decreases with altitude—a factor which shows the turbine to a great advantage over present powerplants.

The turbine would make possible an extremely versatile farm or agricultural airplane. As a duster, the gas-turbine job would have low weight, high take-off performance and good payload. Here again the versatile turbine can do more than just turn a propeller efficiently. An air bleed from the compressor could be utilized to pump spray or dust and to actuate dust agitators. The turbine's small frontal area coupled with its light weight, makes possible full visibility, a dust and fume-free cockpit, and pilot's canopy ahead of the mid-wing. Tip slots, large flaps and generous wing area would combine to give such an airplane a full load (3,500 pounds) take-off run of 450 feet. Rate of climb at this weight would be 1,050 f.p.m. Landing speed at 2,200 pounds would be 34 m.p.h. The conventional spring-steel landing gear seems a logical choice for the rough fields such airplanes would use.

Also of importance to the farmer or duster, would be the inherent simplicity and easy maintenance that make the turbine an ideal power plant for private planes. Low flash-point fuels will considerably diminish fire dangers in all turbine-powered planes.

The pilot or passenger who flies in a turbine plane, large or small, will enjoy a smoothness and quietness not possible in any piston-engined type. And the minutes saved by elimination of ground warm-up and magneto checking will mean saved minutes and dollars for the operator.

Now, a word on exhaust temperatures to stem any worries as to the safety of airport bystanders: Our tests with a Boeing turbine-powered truck show exhaust temperatures no greater than those of present reciprocating engines. Noise levels are lower than the Diesel and, because of the large volume of air which flows through the exhaust pipe, smoke and odor are practically non-existent.

Actually, of course, the little turbine could be used in many of today's small aircraft, either with tractor or pusher installation. In fact, we hope to make such tests within the next year or so just to get airplane operating experience. However, an airplane that is to use this revolutionary powerplant should be designed specifically for it. For instance, a manufacturer conceivably could install one of the popular 90-h.p. air-cooled, four-cylinder horizontally-opposed engines in place of the water-cooled 90-h.p. OX-5 in a 1930-vintage biplane. It would fly, certainly, and probably would outperform the original airplane in spite of added ballast to keep the C.G. within bounds. But full advantage would not be taken of the smaller dimensions and weight of the new powerplant.

The simplicity of the gas turbine makes possible rapid development. Since the end of the war, when the world-wide gas turbine development really started its boom, power ratings have jumped more than 100 per cent. Specific fuel consumption has improved during the same period by more than 20 per cent. Here again simplicity has paid off. The problems we now are tackling—better specific fuel consumption, reliability and longer life—are matters of time. The basic design headaches are pretty well behind us.

Actually, the Boeing turbine was not developed from its inception as a power source for aircraft. Strange as it may seem, the present Boeing turbine started life as a basic research program to investigate problems and general data on jet propulsion for Air Force bombers. Boeing decided to investigate the merits of centrifugal versus axial-flow compressors; single stage versus multiple-stage turbines; turbine blade design, installation problems and so forth. As we built small components for testing we gradually collected a wealth of data not only on turbines in general but specifically on design, fabrication and performance of our then unique, midget-size jet engine.

Our engineers in the propulsion development unit became more enthusiastic over the powerplant each time we ran it on the test stand. It should be pointed out that the engine started life as a pure jet affair, developing 150 pounds of thrust. As such it weighed only 85 pounds complete. One man easily could handle it.

We believed a pure jet could be used for small target aircraft, perhaps certain types of missiles, and also for industrial and agricultural heating needs.

But use of this initial Boeing jet (called the Model 500) as the power source for a shaft-driving engine seemed even more intriguing. It would generate, we saw, an amount of shaft horsepower that would be useful for innumerable power plant needs, both on the ground and airborne. Initial ratings were on the order of 100 to 125 h.p. The presently running turbines generate a maximum of 200 h.p. Rated power is 160 at present, and as pointed out above, we foresee a maximum rating of more than 250 h.p. by 1952.

The turbine-propeller engine was made possible by designing a secondary stage turbine which through a gear box drives a shaft. The unusual feature of this engine is the gaseous connection between power producing section (the Model 500 turbo-jet) and the power output section. In effect, it is one of the world's best torque converters. There is no mechanical connection between the power section and the shaft itself. Since 1947 development of this small turbine has been sponsored by the U. S. Navy, Bu-

15 YEARS AGO

FROM the August, 1935, issue of this magazine:

A new model (A-1) of the Rose *Parakeet* attracted "a considerable amount of attention at Chicago airports." The small, single-seat biplane (span 20 ft., length 17 ft. 6 in.) had a top speed of 100 m.p.h., cruised at 85 and landed at 35. List price was $975.

Sen. William G. McAdoo, President of the National Aeronautic Association, appointed Milton Reynolds "special assistant" to "help promote interest in aviation and the Association throughout the country."

World-wide attention was focused on an unorthodox lightplane, the *Pou-du-ciel*, (*Flying Flea*) designed and built in France by Henri Mignet. An open-

cockpit, single-seater (built so low that the pilot could lean out and pull the chocks from the wheels), the *Flea* weighed 200 pounds empty, and cost only $100 to build (without engine) by amateur labor. [Now working in Argentina, Mignet has built two new *Pou*-type planes.]

The Plymo-coupe, a two-place cabin monoplane produced by the Fahlin Company for the Bureau of Air Commerce, was powered by a standard Plymouth automobile engine. The engine was installed back to front and, except for the addition of a reduction gear and magneto ignition, was a stock Plymouth engine. The plane had a top speed of 120 m.p.h., cruised at 100 and landed at 42. It was expected to sell for approximately $2,000.

The cockpit of a Douglas DC-2 was pictured with this comment: ". . . As more and more new gadgets continue to be added . . . we wonder whether this will lead to a third person in the pilots' compartment—an 'Instrument Scanner'—whose whole object in life will be to read dials and interpret the readings."

TWENTY YEARS AGO

Universal licensing of planes and pilots was urged by Department of Commerce officials who pointed out that rejected planes and pilots were operating in eight states which had no licensing laws.

reau of Ships, which saw many Naval uses for such a powerplant.

The pilot of the gas turbine powered airplane will have some new instruments to watch but will have no magneto switch, manifold pressure gauge or oil temperature indicator. Some new instruments will be added, such as tailpipe temperature and a dual-tachometer for the two turbine stages.

You will start the engine by pressing a starter button until the turbine reaches 5,000 r.p.m. and then turning on the fuel supply and ignition switch. When the compressor and turbine reach this speed, fuel automatically is injected into the burners and a spark plug starts combustion. A normal throttle controls engine speed from then on. There is no need for warm-up, no magnetos to check. Once running, the pilot will merely taxi to the runway, run-up to full r.p.m. and check his prop controls if needed.

Our present Boeing turbines use a standard combination starter-generator, a fuel pump, oil pump and governor.

You may have noticed that we have avoided the term "jet-powered private airplane." Actually, we in the industry are trying hard to divorce the terms "jet" and "gas turbine." Although the turbine-propeller, or turbo-prop engine is similar to the turbo-jet, it is not a jet engine. We prefer to think of the gas turbine purely as a turbine, using the hot exhaust gases in place of superheated steam such as ship turbines use for motive power. The exhaust gas, once passed through the secondary turbine and led through exhaust shrouds, is no hotter than Diesel exhaust.

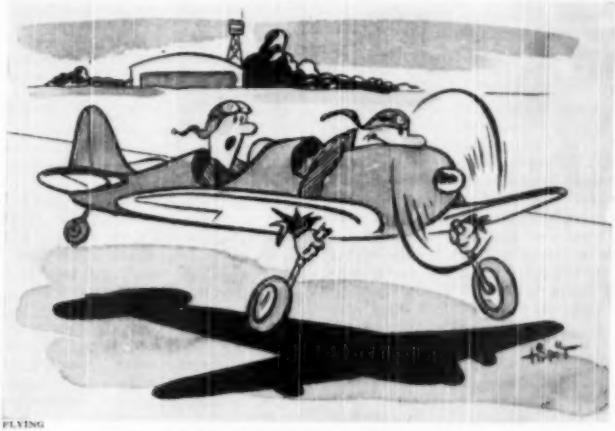
The pure jet is something else again, and to be efficient must be used in a relatively high speed airplane. Fighters, bombers and subsonic transports will continue to use this means of propulsion for the foreseeable future. The turbine-propeller engine will have the intermediate task of providing efficient, modern power for the vast family of airplane types now using piston-engines.

Pure jets—in miniature—may be installed to a limited extent in "aerial hot-rods," and would be at least of academic, if not practical, interest. Of course, the pure jet has proved to be of interest in allowing sailplanes and gliders to become free of external launching devices, as witness the French Fouga with the Turbomeca jet. Our Boeing Model 500 would be just as adaptable to such installations. Small turbine-propeller racing types, similar to the Goodyear class midgets, could be designed around the Boeing gas turbine and would show excellent performance.

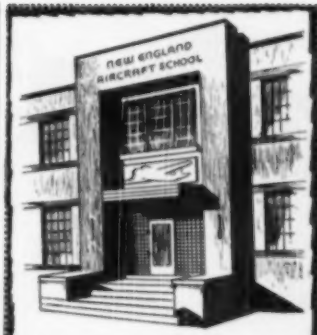
The problems mentioned earlier—development, testing and proving—are being resolved. As in anything mechanical, time is the all-important element. A powerplant which runs perfectly in hundreds of hours of test stand operation may develop bugs in the air. We have learned much about gas turbines in our seven years at Boeing, however. We have operated the mighty midget in a truck and a speedboat with success. And we constantly are getting fixes on such small troubles as have cropped up in service test running.

What remains is the actual proving of the powerplants in flight—and this is not too far away. In designing military aircraft, or large commercial transports, we have in almost every case started prototype construction while the engine we are to use is still on the test stand. Concurrent development of engine and airframe may not be necessary in the case of the small private owner airplane, but such a process would, of course, speed production.

We believe that the emergence of the gas turbine as the eventual successor to the piston-engine is just around the corner. The amazingly rapid progress since Sir Frank Whittle's first practical turbo-jet made its initial flight in 1941 has pointed to the outmoding of reciprocating engines in aircraft just as surely as the piston engine put old Dobbin out to pasture. END



"Relax, Joe, this one's gonna be a perfect three-pointer!"



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Sonic Fighters

(Continued from page 16)

ative of the Junkers *Jumo-004*). Armament consists of one 20-mm. ShVAK cannon and two 12.7-mm. Beresin machine guns.

Both these planes were rushed through design and experimental stages in order to get turbojet experience. They are little more than a passing phase in Russian high-speed design thinking.

About this time the Russians sat back for a breathing spell and took another, and closer, look at what was going on abroad—and what the Germans had dropped into their laps. They immediately saw that the sweptwing layout should be a prime target for fighter and interceptor equipment. Evidence shows, however, that they didn't see the value of swept wings for close support and light jet bombers. In fact, working on domestic and German data as did the U.S., the Russians reached similar conclusions—at about the same time—as did American designers.

They first built a sweptwing research craft to investigate sonic speeds. One of these machines flew in 1948 and is presented here in fully-substantiated detail for the first time. Accompanying illustrations are not "artist's impressions" but accurate reconstructions of actual photos. This is probably the most interesting genuine aeronautical information to come from Russia since the end of the war.

The sleek Russian transsonic research single-seater embodies a number of interesting design features that apparently are repeated in the latest Soviet fighters to enter service:

It employs a reasonably low aspect-ratio wing plan with sharp (35°) sweepback on the leading edge. Aerodynamically it is exceptionally clean, bearing a marked resemblance to Britain's Supermarine 510. Cockpit canopy (smaller than the 510's) is well forward, giving exceptionally good all-round visibility.

The tailplane is sweptback (20°-25°) and is T-positioned on the large-area fin and rudder. This type empennage appears to be repeated on at least one of the latest Soviet sweptwing fighters. Apparently it offers advantages in avoiding broken flow from the "bubble" canopy.

The single turbojet, aft of the cockpit, is fed via "elephant ear" scoops set well forward of the wing-fuselage intersection. It exhausts below the tail unit. These side intakes don't appear ideally suited for high-speed flight, as very low efficiencies have been recorded on some fighter types with similar intakes.

Data on Soviet turbojet development is sketchy, but it is known that two powerful turbojets of German origin are being developed for production. One, the *Jumo-012* (redesignated as the Soviet M-012) originated with the large Junkers organization which was forcibly transferred to Russia complete with its technical personnel. The M-012 is a large axial-flow turbojet designed to give 6,400 pounds static thrust. It has an 11-stage axial compressor and a two-stage turbine. Though heavy—and some 17-feet long—the engine is suitable for installation in the research plane since its length obviates the need for a long jet pipe.

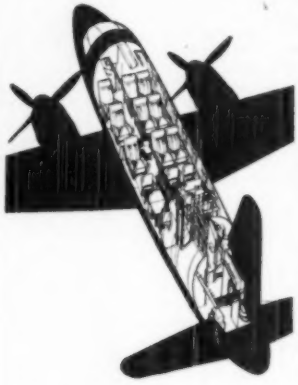
The Russians also got much material on the BMW-018, and they are developing this engine, though only BMW's chief of research went to Russia. German project engineers and specialists on the BMW managed to wriggle out of the Soviet's clutches, and thus it's doubtful if the M-018 is as far advanced as the M-012. This engine has a 12-stage axial compressor, an annular combustion chamber with 24 burners, a three-stage turbine, and an adjustable propelling nozzle. Designed thrust is 7,500 pounds.

Meanwhile, the Soviet fighter regiments needed equipment. The MIG-9 apparently was put through the development mill—and out came a newer fighter about which few details are known except that it's a refined and smaller version of the original. It retains the side-by-side engines in the fuselage belly. The square-cut wing is higher than on the MIG-9 and the rear fuselage appears slimmer, almost looking like a tail boom.

Another design, about which more external details are known because we've studied a very clear photograph, is provisionally called the YAK-17. It's called in some quarters the Russian *Thunderjet*, but it only superficially resembles the

LOOKING BACK

IT'S COMMON knowledge that rear-facing seats in transport planes give added safety during emergency landings. British medical investigators recently said that 50 per cent of the past year's air fatalities could have been prevented



—if seats had been installed facing to the back of the planes.

As a result of English investigations, a number of RAF transports are being fitted with rear-facing seats. First of these is the Vickers-Armstrong Valetta VIP Mark 1 (see diagram).

U.S. Republic F-84 (*Thunderjet*). It is, though, very clean aerodynamically and of typical Soviet simplicity.

Both these planes are probably in the same class as the *Thunderjet* and the *Vampire*. In some respects they may be slightly superior to the U.S. craft—for example, in maneuverability, climb and ability to rough it in and out of small grass airfields. But they don't represent the last word on Russian high-speed aircraft—and if they went into service at all it was probably only in comparatively small quantities. The YAK-17 is the more likely of the two to have reached operational status.

Recently the Reds have built swept-wing fighters that are modern in every essential—probably better than any production plane Britain can show and likely to perform well even against the F-86. Information on these planes is scant but three and possibly four designs are indicated.

First of these (dating back to 1947-48) appears to be a logical development of the YAK-15 single-jet fighter. The YAK-15 had poor visibility but the new machine has the cockpit closer to the nose—so the pilot has a good view over the wing's leading edge. The old wing, practically like the YAK-3's, is replaced by a new structure in the same position but with 30°-35° sweepback. It is square-cut, and has a medium-taper, straight-edged planform.

Tail surfaces are squarish, and the tail-plane (sweepback 20°) is set high up on the orthodox fin.

It's possible, but not likely, that this aircraft is for research purposes only. Improvements are obviously directed toward making the plane a better fighter as well as a faster flyer, and it can be assumed it is a legitimate fighter design.

In contrast, later planes show even more pronounced sweepback on the tail plane, plus sweptback fins and rudders. It might be assumed that the research plane and the YAK sweptwing fighter were limited to around 650-m.p.h. by the design of their tail units. The Russians probably discovered this in air tests and eliminated this factor on recent fighters (notably, those of Yakovlev and Lavochkin).

Logically, therefore, the latest fighters are designed for the speed of sound, and since they're based on practical flying experience at high speeds they will likely perform well at high Mach ratings.

Most disturbing to Western military authorities is the fact that the Soviets have been quick to apply their aeronautical knowledge to service designs. They are probably ahead of Britain—and have fighters which, for tactical work over their own soil under their own special conditions, could not be bettered by production aircraft of any of the Western Union nations.

It may well be possible that these craft suffer from such shortcomings as poor handling qualities at extreme altitude, light armament and limited internal equipment. But at least their limiting Mach numbers are probably higher than any standard fighters now in service with the European Air Forces. END

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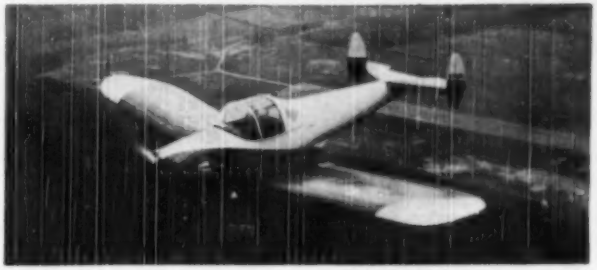

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Fulton Airphibian

(Continued from page 25)

Here's how you do it:

- *Engage three lock levers located one above the windshield and two behind the cabin seat. This sets four upper pins in place.*
- *Crank the lower pins into position, using crank on shelf behind cabin seat.*
- *Attach Sensenich three-bladed propeller, using its own built-in wrench to tighten, then lock prop hub with key.*
- *Try cabin check light and starter switch. The engine won't start and light won't ignite until everything is properly connected.*
- *Crank up wing wheels and retract tail wheel, and the* Airphibian *is ready to fly.*

One person can completely assemble or disassemble the road and flight units in five minutes. A child could do it easily. (It is good to note, however, that the engine's self-starter will not work unless road and flight units are properly attached and secured.)

We took off from Atlantic City airport at 5 p.m. and flew to Saratoga Springs, N. Y., before dark. The *Airphibian* cruised at 110 m.p.h. indicated airspeed at 2,400 r.p.m. The six-cylinder Franklin engine develops 150 h.p. for take-off at 2,600 r.p.m.

The three-bladed Sensenich prop seemed to make engine operation smoother than in other planes I've flown using the same powerplant. Cabin noise was quite loud, but Fulton explained the *Airphibian* we flew didn't have soundproofing. Continental, Inc., has been too busy getting the plane an approved type certificate to bother with the minor comfort additions that will go into production models.

I flew N74104, the second *Airphibian* built and the one put through certificating tests by CAA. The CAA found the *Airphibian* spinnable but only with great difficulty. Wing slots probably are responsible for this spin-resistance. The plane will receive an unrestricted license—and is now completely approved by CAA with the exception of the engine. A routine 150-hour test-stand run is needed before the official okay—but actually, the engine in the plane I flew had already run 820 hours and the same engine in other manufacturers' planes already has been approved. The test is needed only because of the additional gearing for road operation.

Cruising between Atlantic City and Saratoga, I had plenty of time to observe the cabin interior. The plane has left side controls only (no duals) and I asked Bob about this.

"We don't expect anyone actually to learn to fly and drive in the *Airphibian*," he said. "Anyone who already can drive and fly can operate this machine safely."

The leather-padded top of the instrument panel slopes upward from the instruments to the windshield at perhaps a 30° angle. The panel not only is attractive but provides a crash cushion as an emergency safety measure.

You control the *Airphibian* with the wheel both for flying and driving. The plane has four-position flaps which are adjusted with a long lever located at the cabin ceiling. A bungee trim tab is controlled from the end of the flap handle. Engine instruments and primary flight group are standard equipment, as are two-way G.E. radio, navigation and landing-driving lights.

Bob flew as far as Saratoga. We averaged slightly over 110 m.p.h. on the 270-mile flight and burned about 8½ gallons of gas per hour.

We landed at Ballston Spa airport, about seven miles from town, in a rather isolated spot. Runways are long and paved, but phone and transportation facilities aren't on a par with the field itself. We might have had a problem getting to town if we had landed in a non-roadable plane. But that's not the case with the *Airphibian*.

Working alone, Bob Fulton had the two units separated, the air unit staked down and the car unit ready to drive in about 10 minutes.

The next morning it was my turn to drive and fly. At first, I was cautious with the road unit—but quickly learned that it really handles like a car.

It still amazes me how inventor Fulton gets the right rudder pedal to become a foot brake just by disconnecting the two

"And There I Was..."

It had been devilishly hot that day back in 1944 and Lieutenant Smith was dead tired when the last afternoon shift arrived on the flight line.

Wearily consulting his schedule, he turned to meet the two cadets trudging toward him.

"You two are due for a formation ride," he barked. "Ever done any?"

"Not in Advanced, sir," they chorused.

"Well, there's nothing to it. Just get in those Texans and follow me. Everything I do, you do. Get it? Everything I do, you do!"

The three Texans roared off the runway. Smith looked back and saw his pupils flying tight formation on him. He smiled a little. Pretty good boys. . . .

Then it happened. Smith's engine quit.

Quickly he looked for a spot to set her down. And there it was—a convenient cabbage patch. He swung toward it, and skidded in—wheels up, but okay.

Then as he started to climb out, Smith saw two more Texans, wheels up, plow into the earth behind him.

The two cadets climbed out, walked over to the dumfounded instructor and saluted briskly.

"Sir," one of them said, "it wasn't easy, but we did it!"

—Merrin Roland

units. I also can't understand how the battery stays charged with so many driving starts and a pair of bright headlights, but it does. You can adjust the steering wheel to any comfortable position merely by pulling it in or out of the panel—as if adjusting the elevator. The hand throttle is adjusted at the correct idling speed and locked.

When we rejoined the flight unit and tail section, I did the job while Bob took pictures. I followed the step-by-step procedure outlined previously, and we were ready to fly in just six minutes. I especially like the easy way of mounting and locking the prop. If you've ever changed one on a conventional lightplane, you know it's real work and takes time and patience.

At last I was ready to try several take-offs and landings on the long Ballston

FULTON AIRPHIBIAN
One six-cylinder 150-h.p. Franklin engine

IN THE AIR	
Length	16 ft. 9 in.
Wing span	34 ft.
Height (vertical tail)	7 ft. 8 in.
Gross weight	2,100 lbs.
Empty weight (flight unit)	400 lbs.
Useful weight (81 per cent of gross)	1,700 lbs.
Wing area	152 sq. ft.
Wing loading (per sq. ft.)	13.9 lbs.
Power loading (per h.p.)	14 lbs.
Maximum speed	120 m.p.h.
Cruising speed	110 m.p.h.
Landing speed	50 m.p.h.
Rate of climb	600 f.p.m.
Ceiling	12,000 ft.
Fuel consumption (3½ hr. range)	8 g.p.h.
Baggage	50 lbs.

ON THE ROAD	
Length	11 ft.
Width	6 ft.
Height	5 ft. 6 in.
Wheelbase	72 in.
Gross weight	No specified limit
Empty weight	1,200 lbs.
Useful weight	No specified limit
Maximum speed	50-60 m.p.h.
Fuel consumption	20 m.p.g.
Turning radius	22 ft. 8 in.
Baggage	No weight limitation

CONVERSION TIME (One person, no tools)	
Road to flight operation (Engine starter will not work unless units are properly secured)	5 min.
Flight to road operation	4 min.

Source: Continental, Inc., Danbury, Conn.

Spa airport runways. The *Airphibian* take-off is simply a matter of opening the throttle, steering straight down the runway until airspeed reads 60 m.p.h., then hauling back on the wheel. I tried pulling it off the ground at 50 m.p.h. without using flaps but it didn't feel comfortable. The plane mushed and settled—but it did keep flying.

I didn't have an accurate means of measuring take-off run in feet, but it appeared to be about 800 feet with no wind. Run was decreased considerably by lowering a little flap just before breaking ground.

I noticed an unusual characteristic during the take-off run. The wheel con-

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trols both ailerons and front wheels for steering. You get full aileron by rotating the wheel 90° in either direction—but actually, the wheel has to rotate far past 90° for proper control of the front wheels while driving. This doesn't create a problem, however, either in the air or on the ground.

On take-off, you simply steer the *Airphibian* straight with the wheel—and if your track down the runway is straight, the ailerons are in neutral. After you get enough speed, you can use the rudder pedals to keep your path straight down the runway. Aileron and rudder pedals are inter-connected, and you can make coordinated turns with your feet off the rudder pedals and on the floor.

The plane doesn't fly exactly like any other aircraft but its flight characteristics remind me more of an *Ercoupe* than of any other plane I've flown.

In the air, the plane is stable and the rough-air ride has a heavy-plane feel. Both rudder and aileron are lively and responsive, and it takes only slight pressure to return to straight-and-level from any unusual flight position.

In a slip, inter-action of the ailerons and rudder is felt because the wheel control applies rudder and aileron in one direction while foot pressure on the opposite rudder pedal sets up a pressure against the already applied rudder. Nevertheless, the plane slips nicely—though the amount is limited because more rudder than aileron is available.

Best climb (which I clocked at 600 f.p.m.) was at about 77 m.p.h.

The *Airphibian* gives plenty of stall warning. It falls off at about 55 m.p.h. without flaps (50 m.p.h. with full flaps). There's little or no tendency to spin during a stall, and aileron control remains good. It passed the CAA's hands-off spin recovery tests.

During approach at 75 to 80 m.p.h., I got a big surprise when I lowered flaps for a landing. The plane trimmed itself automatically after flaps were lowered! If it's trimmed properly before lowering the flaps the trim is set properly regardless of the degree of flap lowered.

With full flaps, glide angle was steep and provided excellent over-the-nose visibility. Except for a tendency to level off a little high, it lands much like a tricycle-geared plane. Landings and take-offs were simple.

After I felt I was flying the *Airphibian* instead of it flying me (about three circuits of the field), we headed for Ticonderoga, via Glens Falls, N. Y. From Ticonderoga, where we parked the flight unit, we drove into town in the road unit to look at Fort Ticonderoga, which figured prominently in the French and Indian wars.

Although other "non-flyable" autos were forced to park outside the fort's walls, Bob and I got special permission to drive inside.

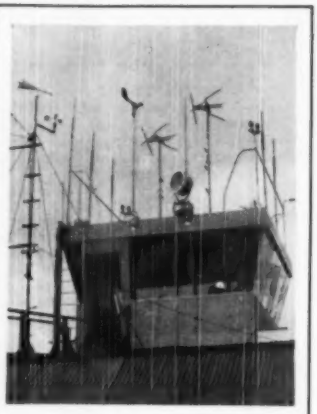
On the return trip to Atlantic City we averaged about 95 m.p.h. against a 10-15 m.p.h. headwind—and used about eight gallons of gas per hour. It was almost dark when we landed in Atlantic City, and I got to see the combination landing and head lights in action. They are mounted in the nose, just behind the prop, and give good night illumination either in landing or driving. Prop reflection of the lights isn't enough to bother the pilot when landing after dark.

During our weekend check flight we flew seven times (650 miles) and drove 12 times (54 miles). Only half of the driving trips were to or from the airport. The rest were sightseeing or running up to some nearby restaurant for lunch or dinner.

The *Airphibian* may be the answer to a new mode of transportation. Obviously, a fault-finder could find many features to improve: the 110-m.p.h. cruising speed could be 150 or more—the cabin could be larger—the plane could carry more passengers. Those features would be fine—if we could get them.

But considering Fulton's invention as an engineering achievement, I can't help but feel that he has done a magnificent job. The prop with the built-in wrench, the mechanism which automatically changes brake to right rudder pedal and prop shaft to wheel drive simply by moving a few levers, are all tributes to one man's reluctance to accept tradition.

Big question in the minds of most potential consumers: How much will the *Airphibian* cost? As FLYING went to press, Bob Fulton still had not revealed the roadable's initial price. END.



WHAT IS IT?

NO ATOMIC LAB, the little building in the photo above is a control tower at Reno, Nev.—a tower that's following the latest trends in airport design. Built by United Air Lines and operated and equipped by CAA, the tower is air-conditioned, has polarized, angled windows and complete VHF and telephone facilities.

Among the forest of aerials are VHF receiving antennas and two spider-web antennas for VHF transmission. Also visible are obstruction lights, anemometer, beacon light and a flashing light gun to direct planes with no radio receivers.

Short-Cut

(*Continued from page 30*)

monoplane of the light aircraft type. Its wingspan is 9 ft. 6 in. and its length is the same. Mounted on a pedestal, the trainer can pitch, yaw, bank and turn 360° in response to control movements from the cockpit. This manipulation also is reflected in the movement of the appropriate control surfaces.

The trainer has the following flight characteristics: dynamic stability, adverse yaw, nose-heaviness during turns, change in pitch attitude with change in power setting, overbanking tendency, torque effect with power and airspeed change, spinning (accidental and/or intentional), elevator trim effect, power-on and power-off stalls, and positive stall recovery. Effects of turbulent air can be simulated. The cockpit contains the usual lightplane instruments, the usual flight controls, plus an elevator trim control and a functioning headset and microphone.

A cloth cyclorama, 15 feet in diameter, 11 feet in height, and 270° in circumference, is placed around each trainer. The white cloth is unmarked except for a black line representing the horizon, reference points for normal climb and glide attitudes, and indications of the cardinal compass directions. The instructor can check the aircraft's attitude or give the student a reference point in the first stages of learning by flashing a small silhouette on the screen from a projector in the nose of the trainer.

For some maneuvers, the student wears blue goggles and the projector is covered by a small piece of amber Plexiglas. The combination of blue and amber prevents the student from seeing the projected silhouette, but the instructor can use it as a scoring aid.

To teach ground reference maneuvers, the instructor uses a small portable blackboard. It's equipped with rollers so it can be moved to simulate drift and effects of forward and side slips.

We also have a small wooden model of a typical lightplane and use it to demonstrate and practice maneuvers and attitudes. The model does not have movable control surfaces.

An actual photograph plus a wooden mock-up of the University of Illinois Airport are used for student orientation and for teaching traffic patterns. Both training aids are large enough to permit the student to move a small paper silhouette along runways and taxiways to simulate actual taxiing and traffic patterns.

For actual flight training, we fly an Aeronca 7-AC, powered by a 65-h.p. Continental engine.

Our latest experiment gave convincing proof of the value of the School Link for training. Two groups of students (21 in each group) were trained under the same syllabus. One group, however, was given practice in the School Link concurrently with flight instruction. The "control" group had just 10 hours of flight time, while the School Link group had 10 hours of flying time and enough School Link time to bring them up to an acceptable

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level of performance. We considered "acceptable level of performance" to mean the ability to perform satisfactorily a maneuver three times in succession—each maneuver being measured in terms of specific standards.

Instructors of varying experience (six men and two women) were briefed on the purpose of the experiment, the methods of instruction, the controls to be observed and the use of the School Link.

At the end of 10 hours flight time, two CAA aviation safety agents gave all students from both groups the CAA private pilot test. The next day, two private pilot flight examiners from other airports gave a second test. The examiners didn't know the students, who were assigned at random. For additional control, another group of private pilots (with an average of 100 hours of flight time) was added to furnish "ringers." (Incidentally, only 43 per cent of the "ringers" passed! Draw your own conclusions.)

Here's what we discovered:

- Comparing the Link and the control group, we found that the Link-trained group was more proficient in most of the categories tested. However, the carry-over from the Link to the airplane on landings and take-offs and on pylon eights was not great; though the carry-over on other maneuvers was high. We're now experimenting with a new method of teaching landings and take-offs (as shown in one of the photos with this article).
- In the general *passing* and *failing* categories there was a difference between the two groups, but it wasn't great enough to be of statistical significance. We believe we can overcome this in our new training syllabus.
- The Link group got a significantly higher average score on the flight test than did the control group.
- Fewer Link students failed four or more items than did control students.
- Students trained in the Link showed greater proficiency in performing maneuvers in the CAA Private Pilot Flight Test than did students who did not receive the Link work. But at the end of 10 hours of flying, not all students were trained to the point where they could pass the test. Results indicated that the time required to train students can be substantially reduced from the 35 hours now required.

We don't believe we have the final word in flight training. But we are convinced, as a result of our experiments, that the flight instructor holds the key to solving our present problems. If we do a good job of training the instructor, the training of the student will be routine.

Instructors should constantly be reviewed in the principles of flight instruction and should be shown the necessity of keeping their students interested. Students should be kept informed of their own progress. And instructors should let students know in advance what they're expected to do, in order to develop what might be called "anticipatory *set*" on the student's part. Emphasis should be placed on *whole* learning rather than on *part* learning. Instructors should use the "talk through" training method, and should attempt to secure overlearning of maneuvers. Practice should be spaced rather than massed. And above all, students should be given an intellectual knowledge of the maneuvers and each flight should be reviewed in an immediate post-flight discussion period.

At the University of Illinois, we believe we're now in a position to formulate a new private pilot flight-training syllabus which, at least for group pilot training, will be an improvement. It will emphasize the utility of the airplane for transportation. We're convinced that the majority of lightplane owners don't appreciate what a plane can do for them as a means of transportation. END

(The complete report of the School Link experiment, written by Ralph E. Flexman, Dr. William G. Matheny and Edward L. Brown, is being published by the University of Illinois Institute of Aviation as "Aeronautics Bulletin Eight." Advice on the University of Illinois experiments was given by Dr. A. C. Williams Jr., as well as the three aviation psychologists and pilots who wrote the bulletin. Experiments were made possible by CAA waivers and flight-testing assistance, and particularly by aviation safety agents William J. Plunkett and David W. Kress of the CAA office in Springfield, Ill. Link Aviation, Inc., manufacturer of the School Link Trainer used in these experiments, plans to make these trainers—improved and modified for contact flight instruction—available to schools in the near future. They probably will be placed in approved Flight Schools on a rental or sales basis.)

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The Mail Box

(Continued from page 6)

m.p.h.; landing speed, 55 m.p.h.; rate of climb, 700 f.p.m.; cruising range, 400 miles. According to All American's president, Ernest Adler, Jr, ". . . the *Ensign* project is relatively inactive at the present time, although we do have future production plans."—Ed.

CONTINENTAL TROPHY RACE

I am interested in obtaining entrance regulations for this year's midget races to be held at the Cleveland National Air Races.

Can you tell me what organization to contact?

TOM MULVEY

Newark, N. J.

● Specifications and entry blanks for 190 cu. in. racing planes to be entered in the Continental Trophy Race may be obtained from either Contest Division, National Aeronautic Association, 1025 Connecticut Ave., Washington, D. C., or B. T. Franklin, General Manager, National Air Races, Union Commerce Bldg., Cleveland, O. (See "Notes on Civil Flying," page 8.) —Ed.

PRIVATE PILOT WINGS

The suggestion that the CAA should issue wings to all private pilots ["The Mail Box," June FLYING] has us intrepid New Mexico PRIVATE PILOTS all agog. However, we feel the cry for recognition has been entirely too feeble . . .

The general public is far from cognizant of the perils we encounter as we roar along . . . we should bend every effort to acquaint them with what dashing fellows we really are.

In keeping with this thought, we are submitting a sketch of a uniform [see cut], suitable for wearing around airports, meetings of aviation enthusiasts, or even taking your girl to the movies. This should leave the casual observer in abso-

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lutely no doubt as to your status as an airman of the first magnitude . . .

E. S. BRANDON

Sante Fe, N. M.

The idea of making official wings available to qualified civilian pilots should be welcomed . . . In addition to providing official designation, lapel-pin wings would invite the attention of friends to our interest in aviation and would give an additional boost to private flying.

If enough of us are interested, let's make the fact known now and help put this idea into action.

KENNETH C. BUCHORN

Austin, Tex.

. . . I think private pilot wings would be excellent promotion for private flying.

KENNETH SAMPSON

Sanborn, Ia.

. . . This idea is really on the ball.

CHARLES E. WARIX

Union City, Tenn.

POLISH EAGLE

I took the enclosed photo last fall at O'Hare Field (Chicago). I'm curious as

to what type it is. I believe it's a product of Great Britain but haven't been able to identify it . . .

WINFRIED E. GERTH

Crystal Lake, Ill.

● The plane that Reader Gerth saw is a Polish *Jan Herse* (RWD-13). FLYING contacted its owner, Herman J. Koplin of Elmwood Park, Ill., who had this to say regarding his unusual plane:

"Unfortunately, the *Jan Herse* was one of the private planes which was badly

damaged [see photo] during a recent windstorm . . .

"Two of these planes, which were manufactured in Warsaw in 1937, came to the U. S. by unknown means. In December, 1947, I saw one of them, No. 20651, looking rather dejected, and thought it would be fun to fix it up. I bought it from three ex-GI's (who had put only 15 hours on it in a year) and repaired it. Shortly thereafter, the man who had purchased the other *Jan Herse* (No. 20652) contacted me and asked if I wanted it for spare parts. He had discovered serious corrosion in the right wing . . .

"After a careful inspection, I decided to rebuild 20652 and save 20651 for spares. We (my 14-year-old son and I) completely rebuilt the right wing . . .

"In December, 1948, the plane was licensed and test-hopped, and we were agreeably surprised at the performance. It had a top speed of 130 m.p.h., cruised at 105 and landed at 45. The automatic full-length leading edge slots were a great help for slow landings, and the 130-h.p. *Gypsy Major* engine, swinging a

(Continued on page 64)

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(*Continued from page 63*)

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Irish Air Force

(*Continued from page 23*)

represent, so far as I know, the first "foreign" coverage of the modern Irish Air Corps.

Unfortunately, military security in the Republic of Ireland muzzles the journalist who wants specific figures on air force size. How large is the Corps? How many planes? How many men? Intelligence officers will answer only: "That comprises information we do not normally disclose."

Clues to the force's efficiency are contained, though, in background data.

The Corps was formed in 1922 from a nucleus of pilots trained in the British Royal Flying Corps (later the RAF). Since then, all Irish military planes have been bought in the United Kingdom and a high percentage of the officers have studied in English service schools.

The two major permanent bases are located a few miles from Dublin: Baldonnel, the headquarters commanded by Col. P. Quinn; and Gormanston, north of Dublin, commanded by Commandant P. Swan. (The rank of commandant is equivalent to major in the USAF.)

Both ground and flying personnel train at Baldonnel, where the Corps school is located. Officer students at Baldonnel get flight training up to the advanced stage, then move to Gormanston for more advanced and operational flight work.

Competition for admission to the Air Corps is keen—and the service is fortunate in being able to select the cream of the applicants. There is no system of compulsory induction.

Each year—or when the Government decides—newspaper advertisements call for military recruits. The Air Force's new men then are picked from the Irish General Training Depot at Curragh Camp in County Kildare. Men selected go direct to Baldonnel when their basic training is completed.

In 1945, recruiting and training of sergeant-pilots was suspended, and today all pilots are commissioned officers. They enter the Corps from the Military College at the Curragh Camp, where they are commissioned second lieutenants after a two-year course. Average age of the new officer "recruits" is 20; official upper age limit is 22.

The pilots spend two years at Baldonnel, where they fly the two-place British Miles *Magister* for primary training and then advance to the Miles *Master 2* (similar to North American *Texan*) for intermediate work. At the same time, they get navigational, radio and bombing training in Avro *Anson Mark-19's*.

At the end of the two years, the officers usually are promoted to lieutenant and go to Gormanston for operational training. There they fly Supermarine *Seafires* converted to land-based requirements. These planes, armed with two 20-mm. Hispano cannon, are powered by 1,150-h.p. Rolls-Royce *Merlin* engines and have a top speed of 400 m.p.h.

At Gormanston, the officers work on air gunnery, formation and tactical flying, and operational problems. After a year, they're ready to serve with Fighter Defense units.

Because the Corps is relatively small, multi-engined bombers aren't in operational service—but multi-engined instruction is given to experienced officers.

Officers serve with the Air Corps on flying status for their entire military career—and are eligible for pension after 21 years. Retiring age limit ranges upward from 48 years, according to rank.

To keep ground crews up to strength, the Irish operate "boy-apprentice" and "Corps workshop" systems. At Baldonnel, the "boy-apprentices" live in spacious quarters and get two years of theoretical and practical training from civilians. During the third year, they enter a rigorous practical course and are graduated as airframe or engine specialists. The recruits enter at any time between the ages of 16 and 18, and must serve for six years after graduation. Forty boys were admitted to this ground training last year.

The "Corps workshop" system inducts boys of 18 into a one-year practical training program, after which they are made "fitters." Fifty boys entered this section last year.

When technicians leave the service, they get proficiency certificates which almost automatically insure their employment by one of the country's industrial concerns. The staff of *Aer Lingus*, the national airline, is largely composed of ex-service personnel.

In addition to normal defense duties, the Air Corps flies antiaircraft "shoots" for the A.A. Artillery (using Miles *Martinet* tugs), tactical exercises with the Army and first-line reserve, and also with the Naval service. Air searches are sometimes conducted over Ireland's rugged coastline, and air photography and survey missions are frequently flown from Baldonnel.

Like all world air forces, the Irish Air Corps has had teething troubles—but the passing of the years has seen the organization grow in importance. Today, it is the only Irish defense corps with its own commanding officer and the status of an Army command. END

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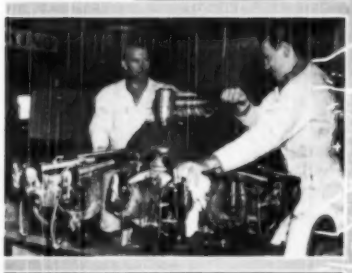

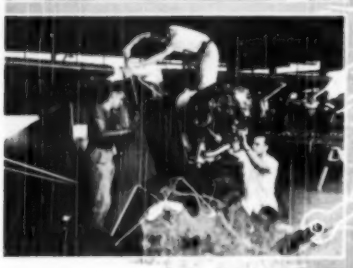

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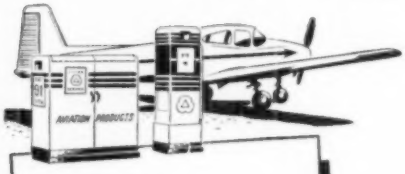

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